

NW GATEWAY PROJECT

**TOWNSHIP DEVELOPMENT ON PORTIONS
(AND PORTIONS OF PORTIONS) 233, 234, 235, 236
AND 237 AND THE REMAINDER OF PORTION 151
OF THE FARM HARTEBEESTFONTEIN 445-JQ**

MADIBENG LOCAL MUNICIPALITY, NORTH WEST PROVINCE

Scoping & EIA Application **Final Environmental Impact Report**

March 2019



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LIST OF ABBREVIATIONS

BID	Background Information Document
CBA	Critical Biodiversity Area
CMA	Catchment Management Agency
DEA	National Department of Environment Affairs
DWS	National Department of Water & Sanitation
DMR	National Department of Mineral Resources
DAFF	National Department of Agriculture, Forestry and Fisheries
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GA	General Authorisation
GNR	Government Notice Regulation
ha	Hectare(s)
HIA	Heritage Impact Assessment
I&AP's	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
KML	File format to display geographic data in Google Earth browser
m³	Cubic metres
Mamsl	Metres above mean sea level
MLM	Madibeng Local Municipality
n/a	Not applicable
NDP	National Development Plan, 2030
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)
NW DREAD	NW Department of Rural, Environment and Agriculture
OHSA	Occupational Health and Safety Act (Act No 85 of 1993)
SABS	South African Bureau of Standards
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	The South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SANS	South African National Standard
SDF	Strategic Development Plan
PoS	Plan of Study
WULA	Water Use Licence Application

Executive Summary

BACKGROUND

The NW Gateway Project involves the establishment of the NW Gateway X2 mixed landuse township on the Remainder of Portion 151 and Portions 233, 234, 235, 236 and 237 of the farm Hartebeestfontein No. 445-JQ. The approximate size of the total project area is 31,5 hectares. The land portions are registered in the name of Shalimoq Investments (Pty) Ltd who is also the applicant for the application. The proposed development site is located at the north-eastern corner of the Damdoryn four-way stop (R512 and R104 crossing), downstream of the Hartbeespoort Dam under the jurisdiction of the Madibeng Local Municipality in the Northwest Province.

The Applicant appointed Landscape Dynamics Environmental Consultants to apply for Environmental Authorisation for the project.

The township application process is being dealt with via the stipulations in the Spatial Planning and Land-use Management Act, 2013 (Act 16 of 2013) (SPLUMA), the relevant Municipal Land-use Management By-laws for the Madibeng Local Municipal Area, as well as the relevant Town-planning Scheme applicable for the Madibeng Local Municipal Area.

PROJECT COMPONENTS

Project components include a hotel, private resorts (residential), shops, places of refreshment, amusement and entertainment; shopping centre, as well as medical facilities that include a private hospital, hospice, frail care, facilities for dementia and Alzheimer patients and doctors rooms.

MAIN LEGAL REQUIREMENT

National Environmental Management Act (Act 107 of 1998)

This application is done in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations published in Government Notice No. R.982, December 2014, as amended. Environmental Authorisation is requested for the following listed activities:

- Government Notice 327: Listing Notice 1: Numbers 12, 19 and 27
- Government Notice 325: Listing Notice 2: Number 15
- Government Notice 324: Listing Notice 3: Numbers 4, 6, 12 and 14

The North West Department of Rural, Environment and Agricultural Development (NW READ) is the regulating authority for this project.

The National Water Act, 1998(Act No 36 of 1998)

A Water Use License Application (WULA) was made to the Department of Water & Sanitation in terms of the following:

- Development in close proximity to the watercourse:
 - Section 21(c): Impeding or diverting the flow of water in a watercourse
 - Section 21(i): Altering the bed, banks, course or characteristics of a watercourse
- Waste Water Treatment Works (WWTW)
 - Section 21(f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit
 - Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource

The National Heritage Resources Act (Act 25 of 1999)

The proposed project falls within the scope of Section 38 of the National Heritage Resources Act, (Act 25 of 1999) and a Heritage Impact Assessment was submitted to the South African Heritage Resources Information System (SAHRIS). Permit and license requirements were determined and will form part of actions required during the Pre-Construction and Design Phase of the project, as stipulated in the Environmental Management Plan.

ENVIRONMENTAL IMPACT ASSESSMENT

The main potential negative impacts associated with the project are the following:

Planning Phase (critical issues that must be addressed in design and planning phase):

- Impact on the watercourse and natural habit (fauna & flora)
- Impact on the Magaliesberg Biosphere Reserve
- Impact on groundwater
- Increased run-off resulting in erosion and a loss of soil
- Impact on cultural-heritage and paleontological environment
- Visual impact
- Increase in traffic
- Loss of agricultural land

Construction Phase

- Impact on the watercourse and natural habit (fauna & flora)
- Increased risk for groundwater pollution
- Increased risk for erosion resulting from construction activities
- Influx of labourers with associated crime, access control, risk for habitat destruction
- Health & safety risk during construction
- Impacts associated with construction activities such as noise and dust
- Impact on cultural-heritage environment

During Operational Phase

- Continuous risk to the watercourse and natural habit (fauna & flora)
- Continuous risk for ground and surface water pollution
- Increased risk for impact on surrounding environment (i.e. habitat destruction, veld fires)
- Increased run-off resulting in erosion
- Increased traffic
- Increased pressure on municipal infrastructure

A comprehensive Environmental Impact Assessment was done which illustrates effectively that all expected negative impact could be mitigated to acceptable levels. All natural, social and cultural functions and processes will be able to continue after mitigation measures have been applied. All the proposed mitigation measures are included in the Environmental Management Plan supplied in Appendix F of this Environmental Impact Report.

The positive impacts associated with the project are the following:

- Unutilised land will be developed to its full potential.
- A safe residential environment will be created.
- The proposed facilities in terms of healthcare will be the niche product of the township, because it will provide a diverse range of medical services which entails an Alzheimer nursing home, convalescent home and auxiliary home, psychiatric ward as well as a hospital and pharmacy. This will address the need for upgraded medical facilities in the province and will provide an essential service to the area.
- The township will provide additional job opportunities during construction and operational phases of the project.
- The application will contribute to the promotion of a diverse combination of land uses that enables a greater intensity of mixed-use development in line with the planning principles.
- The application will provide residential opportunities close to working opportunities in the macro area (tourism, mining and agriculture).
- With the development of the township, measures will be in place to protect the watercourse and natural habitat which is at present not possible.

KEY ISSUED CONSIDERED

Proposed Township Layout

The proposed layout recommended for approval had been guided and influenced by the following key issues:

- The ecologist for the township identified the watercourse with riparian and sensitive vegetation with a 15m buffer zone to be excluded from the development area. This allows for a significant portion of the property to be conserved which is way bigger than the 1:100 year flood line. This is indicated as a "Natural Watercourse and Riparian Area" in the township.

- The heritage impact assessment undertaken confirmed the existence of a small informal graveyard. A dedicated erf has been identified according to requirement supplied by the cultural- heritage consultant to ensure the protection of these existing graves.
- During the WULA Pre-Application Meeting, the Department of Water and Sanitation confirmed that, the Department would allow the portion of the watercourse between the “Natural Watercourse and Riparian Area” and the road to be canalised. Stormwater run-off from the mountain is already channelled underneath the road into a hand-dug stormwater channel to accumulate the run-off into the natural water course on the site. The canalised watercourse/culvert is indicated on the layout plan as a “Channelled Watercourse”.
- Four accesses to the township are required by the North West Province Department of Road and Transport. The exact positioning thereof accommodates the safe distance between each other and the Damdoryn traffic lights as per legal requirement.
- Allowance had to be made to allow for an access road to be used by the Department of Water and Sanitation for their large trucks for maintenance of the dam wall and outlet structures, specifically the large radial gates. The road will be controlled with a locked gate by DWS who will also be responsible for the maintenance of the road.

Impact on the Magaliesberg Biosphere Reserve

The proposed township is situated within the demarcated buffer zone of the Magaliesberg Biosphere Reserve (outside the core and transitional areas of the biosphere). The most important ecosystem in this area is the Magaliesberg mountain. It is however not expected that the township as proposed will impact negatively on the Magaliesberg Biosphere Reserve because of the following:

- This project site is not situated on the mountain, but on the plains north of the mountain.
- The project area is largely isolated due to surrounding developments and it is separated from the mountain via a provincial road.
- The township components are to a large extent an extension of existing land use and or are compatible with other development within the macro area.
- The total site is ±30 hectares. The total built area (footprint of hard surfaces) is estimated to be ±10 hectares, which equates to a built area of only 30% of the total site. It is therefore estimated that approximately 70% of the total site will be either natural open space or landscaped indigenous gardens. This area includes the water course and sensitive riparian and plant communities with a significant buffer zone.

Visual Impact

The potential visual impact was a concern raised by the South African Heritage Resources Agency (SAHRA). A Visual Impact Assessment was subsequently conducted and it concluded the following:

- Sensitivity to this development is low and the intrusive nature of project components is also rated low as the project will be mostly screened and absorbed into the landscape

scene by existing vegetation and topography.

- The project would not be visible from the viewing site on the Hartbeespoort Dam wall as it would be screened by existing vegetation growing on properties east of the development site. Views from residential properties to the south and south west of the site would have elevated views of the project site but many of these would be partially or totally screened by existing tall trees. The township would be highly visible from the upper elevations of the Magaliesberg. However, it would be seen by relatively few people and it would always appear in the same visual envelope as existing development about the R104 and R512 intersection.
- Views from the Magaliesberg always comprise a combination of cultural, natural and man-made landscapes i.e. they are not of pristine or wilderness natural areas. The development would therefore not be out of place given this context i.e. the viewer would most likely not be sensitive to the development.
- It is predicted that low visual resource impacts would result from the construction, operation and maintenance of the proposed development.

Community Consultation

- A comprehensive Public Participation Programme was undertaken for this project and significant measures were taken to identify all relevant stakeholders and enable them to supply informed comment on the township application.
- No objections had been received from any of the Stakeholders and Interested & Affected Parties.
- Significant measures had been taken to address all comment and concerns received. It is the opinion of the EAP that all concerns raised had been addressed in a satisfactory manner.
- Based on the above it is suggested that the proposed township development is not unwanted in the area.

CONCLUSION AND RECOMMENDATION

The proposed North West Gateway Project is planned in a legal, pro-active and structured manner taking all development components, environmental features, site potential and restrictions into account.

The Environmental Practitioner recommends this Environmental Impact Report for approval and Environmental Authorisation by the North West Department of Rural, Environment and Agricultural Development.

CHAPTER 1: INTRODUCTION

1.1 Background

Environmental Authorisation (a Record of Decision) in terms of the Environment Conservation Act (ECA), 1989 (Act Nr 73 of 1989) was issued to Ronson Trading (Pty) Ltd on 28 April 2005. Since that date, the site has exchanged ownership a few times, no development has yet commenced, the National Environmental Management Act (NEMA), 1998 (Act No 107 of 1998) has replaced ECA and the Environmental Authorisation has subsequently expired.

Shalimoq Investments (Pty) Ltd has appointed Landscape Dynamics Environmental Consultants to apply for Environmental Authorisation for the NW Gateway Project with the North West Department of Rural, Environmental and Agricultural Development (NWREAD). The proposed nature of the township as a mixed land use township will remain similar to the one previously authorised, but the layout and project components will be amended to comply with requirement in terms of the environment as well as to address existing need and market potential of the macro area.

1.2 Objectives and Content of the Environmental Impact Report

Objectives of the Environmental Impact Report

According to the NEMA Regulations' Appendix 3, the objective of the environmental impact assessment process is to, through a consultative process

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
- (c) identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts-
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources, and

- (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
- (g) identify suitable measures to avoid, manage or mitigate identified impacts;
- (h) and identify residual risks that need to be managed and monitored.

Content of the Environmental Impact Report

According to the NEMA 2014 Regulations, as amended, Appendix 3, Paragraph 3, the Environmental Impact Report must contain the information that is necessary for the competent authority to consider and come to a decision on the application described. In addition, an EIR must take into account any guidelines applicable to the kind of activity which is the subject of the application. The items are listed below with appropriate reference to the relevant sections in the EIR where the item is addressed.

Regulation requirement	Section in Environmental Impact Report where addressed
(a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Chapter 1, Paragraph 1.4.1 and Appendix F
(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Chapter 2, Paragraph 2.2.1 and Appendix A(1)
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Appendix A(2)(a); (b) & (c)
(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development;	Chapter 1, Paragraph 1.3.1 and Chapter 2, Paragraph 2.2

<p>(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;</p>	<p>Chapter 1, Paragraph 1.3 and Chapter 7, Paragraph 7.1</p>
<p>(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;</p>	<p>Chapter 2, Paragraph 2.1</p>
<p>g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;</p>	<p>Chapter 3, Paragraphs 3.1 and 3.2</p>
<p>(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:</p> <ul style="list-style-type: none"> (i) details of the development footprint alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such; and (x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report; 	<p>Chapter 3</p> <p>Chapter 5, Paragraph 5.2</p> <p>Chapter 5, Paragraphs 5.3.2; 5.3.3 and 5.4.2</p> <p>Chapter 4</p> <p>Chapter 6 , Paragraph 6.3.1</p> <p>Chapter 6, Paragraph 6.1</p> <p>Chapter 6.2.1 and 6.3.1</p> <p>Chapter 6, Paragraph 6.3.1 and Appendix E</p> <p>Chapter 3, Paragraphs 3.1 and 3.2</p> <p>Chapter 3, Paragraph 3.4</p>

<p>(l) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-</p> <ul style="list-style-type: none"> (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures; 	<p>Chapter 6, Paragraph 6.1 and 6.3.1</p>
<p>(j) an assessment of each identified potentially significant impact and risk, including-</p> <ul style="list-style-type: none"> (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated; 	<p>Chapter 6, Paragraph 6.1 and 6.3.1</p>
<p>(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;</p>	<p>Chapter 4 and Appendix E</p>
<p>(l) an environmental impact statement which contains</p> <ul style="list-style-type: none"> (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; 	<p>Chapter 7 Paragraph 7.2</p>
<p>(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMP as well as for inclusion as conditions of authorisation;</p>	<p>Chapter 7, Paragraph 7.3 and Appendix E</p>
<p>(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;</p>	<p>Chapter 7, Paragraph 7.3</p>

(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Chapter 7, Paragraph 7.2 and 7.3 and Appendix E
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Included in specialist reports where relevant – Appendix C
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Chapter 7, Paragraph 7.2 and 7.3
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	Not applicable
(s) an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Chapter 7, Paragraph 7.4
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not applicable
(u) an indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Deviation from Plan of Study for PPP of the EIR Phase – Chapter 5, Paragraph 5.3
(v) any specific information that may be required by the competent authority; and	Not applicable
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable

1.3 Legal Requirement

Legal requirement directly related to the Environmental Impact Assessment process is described in paragraphs 1.3.1 – 1.3.4.

1.3.1 National Environmental Management Act (Act 107 of 1998)

This application is done in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations published in Government Notice No. R.982, December 2014, as amended. Environmental Authorisation is requested for the following listed activities:

GOVERNMENT NOTICE 327: LISTING NOTICE 1

Activity Number 12

The development of—

- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or
- (ii) infrastructure or structures with a physical footprint of 100 square metres or more;

where such development occurs—

- (a) within a watercourse;
- (b) in front of a development setback; or
- (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

excluding—

- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;
- (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;
- (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;
- (dd) where such development occurs within an urban area;
- (ee) where such development occurs within existing roads, road reserves or railway line reserves; or
- (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared

Infrastructure of more than 100m² will be constructed within 32m from a watercourse

Activity Number 19

The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;

but excluding where such infilling, depositing, dredging, excavation, removal or moving—

- (a) will occur behind a development setback;
- (b) is for maintenance purposes undertaken in accordance with a maintenance management plan;
- (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;
- (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or
- (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.

More than 10m³ will be deposited / removed from a watercourse.

<p>Activity Number 27 The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</p> <ul style="list-style-type: none"> (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. 	<p>More than 1 hectare of indigenous vegetation will be cleared for construction purposes.</p>
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GOVERNMENT NOTICE 325: LISTING NOTICE 2 (REQUIRING A FULL SCOPING & EIR PROCESS)

<p>Activity Number 15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for</p> <ul style="list-style-type: none"> (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. 	<p>The total development site is approximately 30 hectares.</p>
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GOVERNMENT NOTICE 324: LISTING NOTICE 3

<p>Activity Number 4 The development of a road wider than 4 meters with a reserve less than 13.5 meters</p> <p>h. North West</p> <ul style="list-style-type: none"> (i) A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation; (ii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (iii) Sites or areas identified in terms of an international convention; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; (v) Core areas in biosphere reserves; (vi) Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve; (vii) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or (viii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999). 	<p>The development site falls within the buffer area of the protected Magaliesberg Biosphere Reserve. The biosphere was established by UNESCO which is an international institution/organisation. The North West Department of Rural, Environment and Agricultural Development (the Competent Authority in this application) is recognising and protecting the Biosphere according to specific management plans. Refer to the applicable Biosphere maps as included Appendix A.</p> <p>The development site falls with a CBA (refer to Appendix A for the applicable SANBI map).</p>
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<p>Activity Number 6 The development of resorts, lodges, hotels, tourism or hospitality facilities that sleeps 15 people or more.</p> <p>h. North West</p> <ul style="list-style-type: none"> (i) World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; (ii) A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation; (iii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999); (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; (v) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or (vi) Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland. 	<p>The development site falls within the buffer area of the protected Magaliesberg Biosphere Reserve. The biosphere was established by UNESCO which is an international institution/organisation. The North West Department of Rural, Environment and Agricultural Development (the Competent Authority in this application) is recognising and protecting the Biosphere according to specific management plans. Refer to the applicable Biosphere maps as included Appendix A.</p> <p>The development site falls with a CBA (refer to Appendix A for the applicable SANBI map).</p> <p>The development will take place within 100m from the edge of a watercourse.</p>
<p>Activity Number 12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>h. North West</p> <ul style="list-style-type: none"> (i) World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; (ii) A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation; (iii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999); (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; (v) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or (vi) Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland. 	<p>The development site falls within the buffer area of the protected Magaliesberg Biosphere Reserve. The biosphere was established by UNESCO which is an international institution/organisation. The North West Department of Rural, Environment and Agricultural Development (the Competent Authority in this application) is recognising and protecting the Biosphere according to specific management plans. Refer to the applicable Biosphere maps as included Appendix A.</p> <p>The development site falls with a CBA (refer to Appendix A for the applicable SANBI map).</p> <p>The development will take place within 100m from the edge of a watercourse.</p>

<p>Activity Number 14</p> <p>The development of—</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p>	<p>Infrastructure and structure of more than 10m² will be constructed within 32m from the edge of a watercourse.</p>
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In terms of the NEMA legislation, application for environmental authorisation is lodged with the North West Department of Rural, Environment and Agricultural Development (NW READ). A Full Scoping and Environmental Impact Assessment process is required. NW READ evaluated the Scoping Report as submitted in October 2018 and supplied the Environmental Assessment Practitioner (EAP) with a decision to proceed with the EIA. The Environmental Impact Report (EIR) (this document) has thus been compiled for further approval.

The following departments and government institutions are key commenting authorities in the EIA process:

- Madibeng Local Municipality:-
 - Town Planning Unit (which includes the environmental component)
 - Engineering Unit
- The Department of Water and Sanitation (DWS)
- The South African Heritage Resources Authority (SAHRA)
- The North West Provincial Heritage Authority (NWPHERA)

NEMA can be regarded as the most important piece of general environmental legislation. It provides a framework for environmental law reform and covers three areas, namely:

- Land, planning and development;
- Natural and cultural resources, use and conservation; and
- Pollution control and waste management.

The law is based on the concept of sustainable development. The objective of the NEMA is to provide for co-operative environmental governance through a series of principles relating to:

- The procedures for state decision-making on the environment; and

- The institutions of state which make those decisions.

NEMA principles serve as:

- A general framework for environmental planning;
- Guidelines according to which the state must exercise its environmental functions; and
- A guide to the interpretation of NEMA itself and of any other law relating to the environment.

NEMA principles are the following:

- Environmental management must put people and their needs first;
- Development must be socially, environmentally and economically sustainable;
- There should be equal access to environmental resources, benefits and services to meet basic human needs;
- Government should promote public participation when making decisions about the environment;
- Communities must be given environmental education;
- Workers have the right to refuse to do work that is harmful to their health or to the environment;
- Decisions must be taken in an open and transparent manner and there must be access to information;
- The role of youth and women in environmental management must be recognised;
- The person or company who pollutes the environment must pay to clean it up;
- The environment is held in trust by the state for the benefit of all South Africans; and
- The utmost caution should be used when permission for new developments is granted.

1.3.2 The National Water Act, 1998(Act No 36 of 1998)

The National Water Act (NWA) guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities which may impact on water resources through the categorisation of 'listed water uses' encompassing water extraction, flow attenuation within catchments as well as the potential contamination of water resources. The **Department of Water & Sanitation (DWS)**, is the administering body in this regard.

A Water Use License Application (WULA) was made to DWS in terms of the following:

- Development in close proximity to the watercourse (bridges)
 - Section 21(c): Impeding or diverting the flow of water in a watercourse
 - Section 21(i): Altering the bed, banks, course or characteristics of a watercourse
- Waste Water Treatment Works (WWTW)
 - Section 21(c): Impeding or diverting the flow of water in a watercourse
 - Section 21(i): Altering the bed, banks, course or characteristics of a watercourse

- Section 21(f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource

The WWTW will be below the NEMA threshold of 2000m³ and NEMA Listing Notice 1, Activity nr 25 is therefore not applicable.

- Underground piping of a channel
 - Section 21(c): Impeding or diverting the flow of water in a watercourse
 - Section 21(i): Altering the bed, banks, course or characteristics of a watercourse

The pipeline will be below all the thresholds as listed under NEMA activity nr 9, Listing Notice 1 and this activity is therefore not applicable to the development.

1.3.3 The National Heritage Resources Act (Act 25 of 1999)

The proposed project falls within the scope of Section 38 of the National Heritage Resources Act, (NHRA), (Act 25 of 1999) and the applicable activities are:

- the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300m in length;
- any development or other activity which will change the character of a site-
 - exceeding 5 000m² in extent
 - involving three or more existing erven or subdivisions thereof
- the re-zoning of a site exceeding 10 000m² in extent

The authorisation process in terms of the NHRA forms part of the EIA process. A Heritage Impact Assessment was submitted to the South African Heritage Resources Information System (SAHRIS).

1.3.4 Additional Relevant Acts, Frameworks and Guidelines

Title of legislation, policy or guideline	Applicability to Project	Regulating authority
National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations published in Government Notice No. R.982, December 2014, as amended in April 2017	Authorisation is required – refer to Paragraph 1.3.1 above	North West Department of Rural, Environment and Agricultural Development (NW READ)
The National Water Act, 1998 (Act No 36 OF 1998)	Water use authorisation would be required– refer to Paragraph 1.3.2 above	The Department of Water and Sanitation
National Heritage Resources Act, (NHRA), (Act 25 of 1999)	Comment must be obtained – refer to paragraph 1.3.4 above	South African Heritage Agency (SAHRA)

National Environmental Management: Waste Act (Act No. 59 of 2008) 2008	Authorisation is not required	Department of Environmental Affairs
Mineral and Petroleum Resources Development Act (No 28 of 2002)	An enquiry which deals with prospecting and/or mining rights will be made by the town planners to the Department of Mineral Resources in terms of Section 54 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002). This will form part of the SPLUMA application.	Department of Mineral Resources
Conservation of Agricultural Resources Act (43 of 1983)	The application that deals with the loss of agricultural land would form part of the SPLUMA application to be submitted by the Department of Agriculture.	Department of Agriculture
National Forests Act (No 84 of 1998) and Government Notice 1339 of 6 August 1976 (promulgated under the Forest Act (No 122 of 1984) for protected tree species), the removal, relocation or pruning of any protected plants	A permit would be required to remove and/or replant protected tree species as identified by Prof Leslie Brown (Enviroguard Ecological Services)	Department of Agriculture, Forestry and Fisheries
Fencing Act (No 31 of 1963) Amended by the Agricultural Laws Rationalisation Act, Act No 72 of 1998	Section 17: Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.	South African Government
South African National Standard Civil Engineering Standards and Publications	To be implemented in the design, construction and operational phases of the project.	South African Bureau of Standards
National Development Plan (NDP) (2030)	To be considered	SA National Government
North West Spatial Development Framework (NWSDF), 2016	To be considered	North West Provincial Government
Bojanala Platinum District Municipality Integrated Development Plan, 2017-2022	To be considered	Bojanala Platinum District Municipality
Madibeng Local Municipality Integrated Development Plan, 2017-2021 (Final)	To be considered	Madibeng Local Municipality
Madibeng Local Municipality Spatial Development Framework, 2015	To be considered	Madibeng Local Municipality
Madibeng Local Municipality Land Use Management Bylaws, 2016	To be considered	Madibeng Local Municipality

The Spatial Planning and Land-use Management Act, 2013 (Act 16 of 2013) (SPLUMA)	A township application is prepared in terms of SPLUMA requirement	The National Department of Rural Development and Land Reform (DRDLR)
Peri Urban Town Planning Scheme, 1975	A Township Application is being prepared in terms of the relevant provisions of SPLUMA	Madibeng Local Municipality

1.4 Project Team

1.4.1 Details of the Environmental Assessment Practitioner

Landscape Dynamics CC is the Environmental Consultants appointed for this project. Landscape Dynamics CC is an environmental consultancy firm established in May 1997. The main line of business since that time up to present is the compilation of environmental impact assessments. Landscape Dynamics CC has a broad client base from both the private and government sectors which has developed over the past 22 years of professional services supplied. The operating base for Landscape Dynamics CC is the entire South Africa; with local representation in Gauteng, the North West Province, Mpumalanga, the Western Cape, the Northern Cape and Limpopo. The Environmental Assessment Practitioners (EAPs) for this project is Ms Annelize Grobler and Ms Susanna Nel.

The Landscape Dynamics Company Profile with the relevant condensed Curriculum Vitae is attached in Appendix F(1).

1.4.2 Professional Team

The impact that this project might have on the environment can only effectively be assessed if all the environmental project components had satisfactorily been identified and considered. A multi-disciplinary approach is therefore required for this Environmental Impact Assessment.

The EIA Project Team members are the following (Company Profiles, CV's and Declaration of Interest of the specialists are attached in Appendix F(2)):

Company Name	Contact Person(s)	Responsibility and/or Project Component
Landscape Dynamics CC	Ms Annelize Grobler Ms Susanna Nel	EIA Project Management Environmental Assessment Practitioners Public Participation Programme
Enviroguard Ecological Services CC	Dr Leslie Brown	Vegetation Ecological and Wetland/Riparian Assessment

Archaetnos Cultural & Heritage Resource Consultants	Dr Anton van Vollenhoven	Heritage Impact Assessment
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The EIA Project Team is supported by the following professional team members:

Company	Contact Person(s)	Responsibility and/or Project Component
Shalimaloq Investments cc	Mr Riaan van Zyl	Applicant
Lombard and Du Preez Land Surveyors and Town & Regional Planners	Mr Amund Beneke Mr Pieter De Haas	Town Planners
Civilconsult Consulting Engineers	Mr Leon Wentzel	Geotechnical Investigation Bulk Engineering Services Report Traffic Impact Study
Architects	Mr Hendrik Mentz	Arttech Architects

1.5 Working Programme

The following programme is pursued in this Environmental Impact Assessment process:

Activity	Planned
Project Management	
Date of Appointment	April 2018
Date of Site investigation with Specialists	April 2018

Initial Advertising (Notification Phase)	
Compilation of General Stakeholder (I&AP) and Landowner List	May-June 2018
Placement of Onsite Advertisements	April 2018
Placement of newspaper ad	April 2018
Notification letter distributed to IAP's and Landowner List	June 2018

Scoping Phase: Specialist Studies	
Specialist Reports:- <ul style="list-style-type: none"> Vegetation Ecological and Wetland Study Heritage Impact Assessment 	April 2018
Other Project Team Members Input:- <ul style="list-style-type: none"> Draft Development Layout 	June 2018
Draft Scoping Report to IAP's and NW READ (with the Application) for comment (30day commenting period)	July / August 2018
Final Scoping Report for approval to NW READ	October 2018
Approval of Scoping Report by NW READ	November 2018

EIA Phase	
Other Project Team Members Input:- <ul style="list-style-type: none"> • Town Planning Motivating Memorandum • Bulk Engineering Services Report • Traffic Impact Study 	November 2018
Draft EIR to IAP's for comment (30 days for comment) and NW READ for comment	January/February 2019
Communicate Final EIR with IAP's - if applicable	March 2019
Final EIR to NW READ for consideration of authorisation	April 2019
Date of acceptance of Final EIR by NW READ	April 2018
Date Environmental Authorisation issued and received	July 2019
Notification to all I&AP's of EA with right to appeal	July/August 2019

CHAPTER 2: PROJECT INFORMATION

2.1 *Need and Desirability*

The need and desirability of the proposed development can be based on the following:

- The proposed development site is strategically located on the Platinum Corridor stretching from Pretoria to Lobatse, which is one of the seven main national corridors in the country. One of the objectives for creating growth and development along these corridors is the enhancement of the tourism sector as well as promoting the image of the Province as a destination for trade and investment. The province needs large capital investments such as the proposed NW Gateway project in order to reach its objectives.
- The inclusion of a hospital in the development will greatly assist in enhancing the general health standards and facilities within the macro area.
- The proposed development will also provide residential opportunities close to places of employment in the macro area (especially mining and agriculture).
- The development as proposed promotes a diverse combination of land uses by offering a variety and diverse combination of tenure forms and thereby creating an integrated and sustainable development.
- The use of existing resources and infrastructure such as roads, transportation and economic and social support will be maximised.
- The site layout plan takes due cognisance of the environmental and heritage sensitivities as identified by the specialists.

The vision of the proposed development is:

- To provide a sense of responsibility through self-ownership
- To develop unutilised land to its full potential
- To create jobs and financial opportunities

Further to the above, the following motivation in terms of the Madibeng Spatial Development Framework 2018 and the Hartbeespoort Area Precinct Plan, 2014 are given in the SPLUMA Motivating Memorandum (attached under Appendix D4):

- Shalimaloq Investment (the Applicant) purchased the development site which is located within a tourism area with the objective to establish a town that will contribute towards the local economic development of Madibeng and enhance the local tourism and economic opportunities.
- The directors of Shalimaloq Investment has identified excessive economical-tourism investment opportunities that has been generated along the P125/1 and P2/4 routes and its intersection
- The intersection of provincial Roads P2/4 and P251/1 is well known as Damdoryn crossing that is a very popular tourism destination. The routes link very well with other development nodes such as the greater Hartbeespoort area and the Local Madibeng Municipal area, Rustenburg (with adjoining local municipal areas and greater North West

- Province) and greater metropolitan nodes in Gauteng such as Tshwane and Johannesburg.
- The tourism opportunities that are being offered here, makes a major contribution to the local economic development of Madibeng Municipality. This contribution adds great value to the local development goals through social-economic-tourism development. The Madibeng Spatial Development Framework 2018 (MSDF) (MSDF, 2018: 94) acknowledge this area for rural tourism development along provincial Road P2/4. There is a need to address this development goal through adequate and well-planned development as being proposed by this Land Development Application.
 - The MSDF emphasises that development within the Hartbeespoort area should be governed by the Hartbeespoort Precinct Plans, which demarcate the focus area and sets the spatial development directives within this node (Hartbeespoort Area Precinct Plan, 2014: 60). The applicant followed the development principles set by the Madibeng SDF as well as the directives of the Hartbeespoort Area Precinct Plan (as prescribed by the Madibeng SDF) prudently, because the applicant believes that the development principles will pave the way for maximum economical-tourism opportunities and development.

The following also applies in terms of the proposed land uses:

- Land uses were proposed that will provide in the needs of all the generations of the rural community. This proposed application will provide permanent and non-permanent residential opportunities, which will range for the provision from the youth to the elderly to prevent the decaying of the rural community:
- Residential 1 stands and dwelling units will accommodate youth to mid-aged generations with permanent residential opportunities.
- The Retirement resort will provide exclusively for the elderly who would like to retire within a peaceful environment in proximity of good infrastructure and services (especially the medical care and contribute towards the niche market). Treatment is also seen as the *“protection and promoting of human rights”* (White Paper on the Rights of Persons with Disabilities, 2015:31) whereof the lack of such facilities prohibits basic human rights and need to be addressed within North West Province. The National Development Plan (NDP, 2030) disclose all health concerns and issues to be *“integrated into all facets of planning, recognising that there is no one-size-fits-all approach”*. The environment in which the proposed land uses appears, were considered on its own merits.
- Therefore the *“Special”* land uses, shops, places of refreshment, places of amusement, hotel, restaurants, conference facilities, chapel, recreational, health and fitness, spa, hospital and offices will be complementary towards each other. These land uses will provide within the needs of all generations. The environment in which such facilities appears, should be considered on its own merits.
- Roads P2/4 and Road P251/1 are well connected with the greater region (Madibeng SDF, 2018:84) will accommodate the variety of different land uses.

General objectives of Integrated Environmental Management as set out in section 23 of NEMA

The stated objectives of Integrated Environmental Management as set out in Section 23 are to ensure integrated decision-making and co-operative governance so that NEMA's principles and the general objectives for integrated environmental management of activities can be achieved.

The goals are to

- a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;
- b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;
- c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;
- d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;
- e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and
- f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.

For this project the following actions were taken to reach the general objectives of Integrated Environmental Management as set out in Section 23 of NEMA:

- a) Applicable environmental, economic and social aspects have been assessed, thereby ensuring an integrated approach in order to balance the needs of all whom would be affected by this development.
- b) Impacts have been described and assessed elsewhere in this report. Mitigation measures have been supplied in order to ensure that all identified impacts are mitigated to acceptable levels. Alternatives have been thoroughly assessed and the best possible solution represents this development proposal.
- c) The development proposal has to be evaluated and approved by NW READ and no construction may commence prior to the issuing of the Environmental Authorisation.
- d) The procedures which were followed during the public participation programme were based on the NEMA EIA Regulations which came into effect on 14 December 2014, as amended.
- e) NW READ will take all information as represented in this report into consideration and may request further information should they feel that further studies/information is required before an informed decision can be made.
- f) The mitigation measures as supplied in this report together with the measures as per the Environmental Management Programme are deemed to be the best way to manage

anticipated impacts.

Principles of Environmental Management as set out in Section 2 of NEMA

Chapter 2 of NEMA provides a number of principles that decision-makers have to consider when making decisions that may affect the environment, therefore, when a Competent Authority considers granting or refusing environmental authorisation based on an Environmental Impact Assessment, these principles must be taken into account.

The NEMA principles with which this application conforms are described as follows —

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable.
- Sustainable development requires the consideration of all relevant factors.

The social, economic and environmental impacts of activities, including disadvantages and benefits, were considered, assessed and evaluated, and informed decision-making by the authority is hereby made possible.

The following conclusion is made in terms of need and desirability:-

- The application promotes the optimum use of land and will contribute to the development of the town.
- The development will contribute to the promotion of a diverse combination of land uses that enables a greater intensity of mixed-use development in line with general planning principles.
- The creation of more job opportunities is a high priority for this area. This development will provide additional job opportunities in both the construction and operational phases in various areas of employment.

The proposed North West Gateway Project is planned in a legal, pro-active and structured manner taking all development components, potential and restrictions into account.

2.2 Project Description

2.2.1 Locality & Regional Context

The proposed development site is located at the north-eastern corner of the Damdoryn four way stop (R512 and R104 crossing), downstream of the Hartbeespoort Dam under the jurisdiction of the Madibeng Local Municipality in the Northwest Province (also refer to the locality map in Appendix A).

21 SG digit codes

The properties involved in this development are:

1. Farm Hartebeesfontein 445-JQ, portion 233
2. Farm Hartebeesfontein 445-JQ, portion 234
3. Farm Hartebeesfontein 445-JQ, portion 235
4. Farm Hartebeesfontein 445-JQ, portion 236
5. Farm Hartebeesfontein 445-JQ, portion 237
6. Farm Hartebeesfontein 445-JQ, remainder of portion 151

T	O	J	Q	0	0	5	2	0	0	0	0	0	4	4	5	0	0	2	3	3
T	O	J	Q	0	0	5	2	0	0	0	0	0	4	4	5	0	0	2	3	4
T	O	J	Q	0	0	5	2	0	0	0	0	0	4	4	5	0	0	2	3	5
T	O	J	Q	0	0	5	2	0	0	0	0	0	4	4	5	0	0	2	3	6
T	O	J	Q	0	0	5	2	0	0	0	0	0	4	4	5	0	0	2	3	7
T	O	J	Q	0	0	5	2	0	0	0	0	0	1	5	1	0	0	0	0	0

2.2.2 Project Components

Refer to Appendix B for an A3 size map of the layout plan

The proposed land-uses are as follows:

Entertainment and resort

- Shops, Places of refreshment, Amusement, Entertainment ($\pm 7\ 500\text{m}^2$)
- Waste Water Treatment Plant (also refer to Appendix D for a brochure of the biological system that is recommended)
- Private resort
- 60 storage units ($\pm 17\text{m}^2$ each)
- Trailer and caravan parking
- Boutique guest house and spa ($\pm 1800\text{m}^2$)

Hotel and Retirement Village

- Administration and Welcome Centre
- 150 room hotel ($\pm 10\ 000\text{m}^2$)
- 22 Luxury Retirement Village units (144m^2 each)
- 112 2-bedroom Retirement Village units (117m^2 each)
- Green Zone / Private Open Space
- Restaurant
- Industrial Kitchen and Laundry
- Recreation Centre
- Wellness Clinique

- Clubhouse (450m²)
- Chapel (100m²)
- Bowling grounds
- Gardens and walkways

Institutional (medical facilities) (± 20 000m²)

- Hospital and step-down clinic and/or a neurological centre (i.e. where Alzheimer's patients can be treated).

Ancillary and Subservient

- Parking
- Personnel parking
- Staff Quarters
- Delivery yard

Cemetery for existing graves only

- 225m² around the existing graves will be fenced in with access for family members.

Total build area = ±100 000m² (10 hectares)

DISCUSSION

Layout

The layout of the township was designed around the natural environment in order to preserve the drainage line, its riparian area as well as the identified buffer and to use it to the advantage of the aesthetical view of the township. The proposed township fills the currently undeveloped land between the high activity Damdoryn crossing and the tranquil Mount Amanzi resort towards the north east.

Low-density development will occur in the north eastern part of the layout, which is close to the green open space (drainage line and buffer area). Approximately 3,2 hectares of natural environment will be zoned as Private open space that will preserve the water course with its natural elements and natural biodiversity. Residential development will surround the natural environment and serve as the buffer between the economical and tourism activities to the south western part of the layout. The residential development will also be controlled by private access and security. The types of land uses that will be included to this area will be dwelling houses, dwelling units, recreational, parking and storage for the residents.

The residential land uses will connect well with the residential village of the Department of Water and Sanitation as well as the residential village of Mount Amanzi. The Sewage Treatment Plant is also located to the far north eastern (Erf 19) because the consulting engineers for this project

identified this erf as the best place to locate the sewer treatment plant. Existing grave yards will also be protected (situated on Erf 23). Erven 20,21,25-27,32 and 33 are larger stands (average size of 4515m²) which also makes provision for a combination of residential use, hotels of boutique hotels. Provision is made for the combination of these uses due to unpredictable market forces that will influence the development over time.

The land uses which will accommodate tourism, economical and medical development (Erven 52, 55-59) will be located close to existing developments (Damdoryn crossing, filling station, art shops, flea market, restaurants etc.) next to the intersection and along the provincial roads (P2/4 and P251/1). The Retirement Resort erven are located within the centre of the layout plan which will provide close access to the economic activities, entertainment and medical services and bound the economic activities between the residential land uses and the roads and road intersection.

This will ensure that the business activities are clustered around the intersection and the residential land uses will limit the business activities that will ensure moderate land development within this area that will stay within the boundaries set by the Hartbeespoort Precinct plan.

Cemetery for existing graves only

The cemetery is situated in between erven of the Private Resort (shaded green in the Layout Plan and marked as "2 - HERITAGE"), close to the eastern border of the site. The graves will be kept *in situ* and the cemetery will be fenced. Family members will be allowed access to the cemetery.

Institutional (medical facilities)

Medical facilities will be the niche product of this proposed township, because it will provide a diverse range of medical services which will entails an Alzheimer nursing home, convalescent home and auxiliary home, psychiatric ward as well as a hospital and pharmacy.

The exact layout (footprint) of the hospital, step-down clinic, parking areas, delivery areas, gardens, etc. will be determined by the requirements of the Department of Health.

Application for a Private Hospital (142 bed facility) was made to the NW Department of Health and approval was granted by the Provincial Private facility Adjudication Committee on 21 November 2018. Conditions as stipulated in this approval are included in the Environmental Management Plan and are attached under Appendix F.

LAYOUT IN RELATION TO THE ECOLOGICAL SENSITIVITY MAP

High Ecological Sensitivity: Drainage line and buffer area (open space)

According to the *Ecological Report (Vegetation and Aquatic features)* (attached under Appendix C) the following development density is proposed for this area:

- These areas are ecologically valuable and important for ecosystem functioning. This land

should be conserved and managed and is not suitable for development purposes.

- A 15m buffer zone around the seasonally moist drainage channel has been demarcated and is included in the High Ecological Sensitivity zone.

This demarcated High Ecological Sensitivity Zone is earmarked as open space, which means that no development will take place within this zone. This zone is approximately 5.5 hectares and constitutes approximately 18% of the total development site.

Medium-High Ecological Zone: Private Resort

The area north of the drainage line has been demarcated as having a medium-high ecological sensitivity. According to the *Ecological Report (Vegetation and Aquatic features)* (attached under Appendix C) the following development density is proposed for this area:

- Low-density development could be considered with limited impact on the vegetation / ecosystem. It is recommended that larger sections of the vegetation are maintained.

The development proposed for this area is Private Resort. The area will consist of 52 erven with the smallest erf being 681m² and the largest 4 347m². Most of the erven will average an approximate erf size of 750m². In order to conserve the biodiversity of the site, the development proposal was discussed with the ecologist and it was agreed that a lower density development could be allowed if clusters of protected trees and natural vegetation are identified and excluded as far as possible from the development. It is therefore recommended that a specification be included in the Environmental Management Plan which will require that the detail layout of this portion of the development be done on site in cooperation with an ecologist to ensure that indigenous clusters of trees are integrated in the final design.

Strict guidelines in terms of landscaping that would have to be followed by all residents will be included in the EMP. These guidelines will include, but not be limited to the following:

- Where new vegetation is introduced to the site, an ecological approach to rehabilitation and vegetative screening measures, as opposed to a horticultural approach to landscaping should be adopted. For example, communities of indigenous plants enhance biodiversity and blend well with existing Magaliesberg vegetation. This approach can significantly reduce long term costs as less maintenance would be required over conventional landscaping methods as well as the introduced landscape being more sustainable.
- All new landscaping must be done with a strong “indigenous only” approach.
- All large indigenous tree species should be conserved wherever possible and incorporated into the design of the project.
- Landscaping should be environmentally sensitive and should meet the following requirements:
 - Limited irrigation through water-wise gardening (use local plants adapted to local conditions).
 - Strict fertiliser, pesticide and herbicide control must be applied.
 - Reduction of weeds and erosion control by minimum tillage gardening practices (groundcovers and mulching).

- Allowance should be made for free flow of water and drainage from the site; therefore only approved palisade fencing/combined palisade and solid wall fencing must be constructed along the outside boundaries of the township. This requirement is included in the Design and Pre-Construction Phase in the EMP.
- New property owners must be informed that only palisade fencing or a combination of palisade and solid wall fencing will be allowed to allow for natural stormwater flow, migration of small fauna species as well as a see-through effect in terms of visual impact. This requirement is included in the Operational Phase in the EMP.
- Significant considerations in terms of a 'green' architectural approach will be considered. These requirements are listed in Chapter 2, Paragraph 2.5 of this document.

Important to note is that the same principles will apply for the section of the development to the south of the drainage line which has been identified as having a Low Ecological Sensitivity. Indigenous landscaping combined with the ecological approach to rehabilitation as opposed to a horticultural approach will ensure that the low ecological sensitive area be rehabilitated to increase the biodiversity of the site. This is a positive impact of this project.

An approximate third of the Medium-high Sensitivity Zone will be used for Luxury Private Resort Units (144m² each) as well as 2-bedroom Private Resort units (117m² each). There will be no fences within this area and the same landscaping guidelines will apply.

Medium Ecological Sensitivity: Institutional (hospital and step-down clinic)

The south-eastern corner of the site (unshaded and marked as "10" on the Layout Plan) has been demarcated as having a Medium Ecological Sensitivity. According to the *Ecological Report (Vegetation and Aquatic features)* (attached under Appendix C) the following development density is proposed for this area:

- Medium density development could be considered with limited impact on the vegetation / ecosystem. Where possible certain sections of the vegetation could be maintained.

The hospital and step-down clinic is proposed within this zone and large sections of vegetation will necessary be lost. However, the landscaping guidelines as mentioned above will apply and the biodiversity of this zone could be maintained to an extent via the gardens that will surround the buildings and parking areas.

Low Ecological Sensitivity:

A very large part of the site has been demarcated as having a Low Ecological Sensitivity. According to the *Ecological Report (Vegetation and Aquatic features)* (attached under Appendix C) the following development density is proposed for this area:

- Development could be supported with little to no impact on the natural vegetation / ecosystem.

As explain above, the Private Resort earmarked for the area south of the drainage line will

increase the biodiversity of that specific area when the landscaping guidelines are being followed. The gardens in between the other resort units will also be subject to these guidelines. This is a positive impact of the proposed development.

CONCLUSION OF LAYOUT VS ENVIRONMENTAL SENSITIVITIES

There is some form of connectivity from the Private Open Space to almost the entire site and the biodiversity of some degraded areas will be enhanced after landscaping has been done.

The total site is ± 30 hectares. The total built area (footprint of hard surfaces) is estimated to be ± 10 hectares, which equates to a built area of only 30% of the total site. It is therefore estimated that approximately 70% of the total site will be either natural open space or landscaped indigenous gardens.

It is the opinion of the EAP that the layout as proposed balances the biodiversity of the site with the need and desirability of development within a sought after area.

2.2.3 Design, Construction and Operational Targets

It is planned to have all authorisations and engineering designs in place by the first quarter of 2019. Construction of the services and structures as well as marketing should commence as early as possible thereafter.

2.3 Town Planning Application

The township application process is being dealt with via the stipulations in the Spatial Planning and Land-use Management Act, 2013 (Act 16 of 2013) (SPLUMA), the relevant Municipal Land-use Management By-laws for the Madibeng Local Municipal Area, as well as the relevant Town-planning Scheme applicable for the Madibeng Local Municipal Area.

A township application was previously made to the Madibeng Local Municipality. The application was approved but the erven has not yet been proclaimed. Extension has been granted for the finalisation of the application on 27 June 2018 and is valid for one year. Please refer to Appendix D for copies of correspondence between the Madibeng Local Municipality and Lombard du Preez Land Surveyors and Town Planners.

The new proposed township layout as described herein was submitted to the municipality for approval on 12 December 2018 (refer to Appendix D).

2.4 Bulk Engineering Services

A **Services Availability Report** was compiled by CivilConsult Consulting Engineers and is attached under Appendix D. A summary thereof follows below.

Water

Existing Water Infrastructure

An existing 250mm \emptyset rising main runs parallel and on the northern side of Road P2-4, south of the Proposed Development. This rising main feeds the Kosmos Reservoir, south east of the Proposed Development.

An existing 350mm \emptyset gravity main distributes water to the Kosmos Residential Developments from the Kosmos Reservoir. An existing irrigation canal runs parallel to the Crocodile River, north east of the Proposed Development.

Proposed Water Infrastructure

A proposed water pipe will be installed from the southern boundary of the Proposed Development parallel and on the northern side of Road P2-4 up to the intersection between Road P2-4 and Road P251-1 from where it will cross Road P2-4. From here the water pipe will run parallel and on the eastern side of Road R512 (P123-1). This pipe will cross Road (R512) P123-1 approximately 380m from the intersection between Road P2-4 and Road P251-1 and will run parallel and on the western side of Road (R512) P123-1 up to the existing 350mm \emptyset gravity main where it will connect.

Proposed boreholes and the irrigation canal water could be utilised for landscaping portions of the Proposed Development.

Sewer

General

The natural drainage pattern of the Proposed Development is from south and south west towards an existing watercourse intersecting the Proposed Development from south west to north east.

Existing Sewer Infrastructure

No formal municipal infrastructure exists in the immediate vicinity of the Proposed Development.

Proposed Sewer Infrastructure

Sewage from the Proposed Development will gravitate to Erf 37 of the Proposed Development where a proposed Sewage Treatment Facility (STF) will be constructed.

Sewage from the south eastern portion of the Proposed Development will gravitate towards the existing watercourse. From here an outfall sewer will be installed and will run parallel and on the south eastern side and above the 1:100-year flood line or 32m development line of the existing

watercourse up to a proposed STF where the raw sewage will discharge and be treated. The effluent will be treated to Special Standards of the Department of Water and Sanitation (DWS) and will be discharged into the existing watercourse.

Sewage from the northern and western portion of the Proposed Development will gravitate towards the existing watercourse. From here an outfall sewer will be installed and will run parallel and on the north western side and above the 1:100-year flood line or 32m development line of the existing watercourse up to the north eastern boundary of the Proposed Development. From here the sewer will cross the existing watercourse where the raw sewage will discharge and be treated. The effluent will be treated to Special Standards of the DWS and will be discharged into the existing watercourse.

The internal sewerage reticulation of the Proposed Development will connect to a municipal outfall sewer once such a municipal sewerage reticulation system is in place.

Please note that the engineers confirmed that transportation of sewage and effluent will *not* be done in pipes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more. NEMA Listing Notice 1, Activity 10 is therefore not applicable to this project.

The engineers further confirmed that that the treatment plant will *not* have a daily throughput capacity of more than 2 000m³ but less than 15 000m³. NEMA Listing Notice 1, Activity 25 is therefore not applicable to this project.

Storm Water

General

The natural drainage pattern of the Proposed Development is from south and south west towards an existing watercourse intersecting the Proposed Development from south west to north east.

Existing Storm Water Infrastructure

No formal municipal infrastructure exists in the immediate vicinity of the Proposed Development. An existing natural watercourse intersects the Proposed Development from south west to north east.

Proposed Storm Water Infrastructure

The internal storm water run-off from the Proposed Development will drain via paved areas to kerb and/or grid inlets situated at low points in the Proposed Development and will discharge into the existing watercourse above the 1:100-year flood line or 32m development line.

Several storm water culverts will be constructed for the internal roads crossing the existing watercourse.

The implementation of SUDS for parts of the Proposed Development is depended on the permeability of the residual weathering products and the texture of the transported materials therefore a geotechnical investigation and percolation tests should be conducted. Should the geotechnical investigation and percolation tests conclude that the soil conditions on site are not suitable for the implementation of this infiltration trench option, alternative options will be investigated (to be included in the EI Report).

The storm water outlet structures will cater for gabions and reno-mattresses at the outlets to minimize the possibility of erosion at the point of discharge.

Roads

Direct access from Road P2-4 and Road P251-1 to the township had been communicated with the North West Province: Department of Public Works and Roads and their requirements are reflected in the final layout proposed in Appendix B(4).

The intersection between the accesses from Road P2-4 and Road P251-1 will be designed and upgraded in accordance with the Standards and Specifications of the North West Province: Department of Public Works and Roads.

Wayleave approval will have to be acquired from North West Province: Department of Public Works and Roads to allow ingress and egress to the Proposed Development.

Requirements from the Traffic Impact Study included in Appendix D must be implemented and conditions must be included in the Environmental Management Plan in Appendix F.

A meeting was held with the North West Province: Department of Public Works and Roads and they suggested that the access road closes to the 4-way stop on Road P251-1 be moved 150m to the north. This recommendation is included in the Preferred Layout Plan as attached under Appendix B.

Solid Waste Disposal

The estimated volume of solid waste to be generated by the Proposed Development on a weekly basis will be determined with the finalization of the Township Layout.

The collection of solid waste in the Proposed Development will be carried out by a Home Owners Association and/or a Body Corporate who might appoint a private company for this purpose.

The solid waste will be collected and transported from the Proposed Development to the solid waste disposal site of the Local Municipality of Madibeng, north of Seasons Eco Golf Course, either by the Local Municipality of Madibeng or by a private contractor.

Electrical Engineering Services

The Proposed Development will be supplied with electricity from the Eskom Supply Network.

The existing Eskom networks do not have enough spare capacity available for the Proposed Development.

A new 11kV Eskom bulk supply is proposed by installing a new CT/VT metering unit near the Proposed Development and by constructing a new 11kVA overhead line from the Eskom Substation.

The Proposed Development could be supplied directly from the CT/VT metering unit via a T1 Unit to be installed inside the boundary of the Proposed Development.

The viability of this proposal depends on the availability of enough spare capacity at the Eskom Substation. An application for the required electrical capacity will be logged with Eskom once all the land uses have been finalised – this stipulation will be included in the Environmental Management Plan.

2.5 Architectural Concept

The following principles in terms of a 'green' and design approach will be considered:

In the light of the present and future situation with power and water supply in the Madibeng area and the country in general, all measures of power and water conservation should be implemented in any new development.

Hartbeespoort Environment Heritage Association

The following relevant guidelines applicable to development in the Madibeng area, compiled by the Hartbeespoort Environment Heritage Association (HEHA) in July 2008 should be considered :-

- Solar water heaters of at least 200 litres insulated storage capacity with at least 2,5m² solar panel per household. In economic housing the capacity can be decreased to 100 litres. This is the greatest single factor in energy savings in an average household.
- Electrical room heating or air conditioners should be restricted. Solar under floor heating or tromb  wall heating is recommended.
- All buildings and sites to be orientated to the north and all living area windows to face north with sufficient roof overhangs. If these recommendations are met, no additional heating is generally required in this climate zone.
- Roof insulation equivalent of at least 40 mm glass wool compulsory. Wall insulation (e.g. cavity walls) is recommended on south and west walls.
- Kitchen stoves to be gas fired, not electrical. Gas is a more efficient heat generator than electricity. It also renders the user less vulnerable to electricity supply failures.

- Low energy lights are compulsory. No incandescent bulbs.
- Exterior lighting must be directed downwards and be of low wattage. No light pollution is allowed. The user has no benefit of light that is spilled up in the air and is wasted.
- All roofs to be fitted with gutters and down pipes, leading to rain water storage tanks of sufficient capacity (as near as possible to ½ cubic meter per 1 m² of roof area). This rain water should be used for building purposes, gardening, swimming pools, washing and toilet flushing. No municipal water should be allowed for these functions. This measure results in saving on running cost and less vulnerability to service failures. It also results in savings on storm water infrastructure.

Water Management

Additional water saving measurements are recommended as follows:

- Dual flush toilets to be installed.
- Low-flow shower heads must be installed
- Tap aerators should be used.
- The use of grey water (the use of water from showers, baths and basins) for irrigation purposes should be encouraged.
- ‘Water wise’, indigenous plants must be given priority in the landscaping design for the development.

Electricity

The total demand for electricity can be reduced if the following energy saving measures are implemented:

- Compact fluorescent lights lamps (CFL) to be used instead of ordinary bulbs
- Low-energy lamps will be used for exterior lighting
- The following is recommended for the hot water systems at each unit:
 - Geyser blankets should be installed
 - At least the first 1,5m of hot water outlet pipes should be insulated
 - The possibility of using solar geysers and panels should be investigated.

Paint

- Structures should be painted with natural colours that reflect and compliment the natural colours of the surrounding landscape.
- To reduce the potential of glare, the external surfaces of structures should be articulated or textured to create interplay of light and shade.

Lighting

Light pollution is largely the result of bad lighting design, which allows artificial light to shine outward and upward into the sky, where it’s not wanted, instead of focusing the light downward where it is needed. Ill designed lighting washes out the darkness of the night sky and radically alters the light levels in rural areas where light sources shine as ‘beacons’ against the dark sky and are generally not wanted.

Of all the pollutions faced, light pollution is the most easily remedied. Simple changes in lighting design and installation yield immediate changes in the amount of light spilled into the atmosphere. The following are measures that must be considered in the lighting design of the Project:

- Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the site.
- Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on illegal entry to the site.
- Minimise the number of light fixtures to the bare minimum, including security lighting.
- Security lighting should only be used where necessary and carefully directed, preferably away from sensitive viewing areas.
- Wherever possible, lights should always be directed downwards to avoid illuminating the sky.

CHAPTER 3: ALTERNATIVES

3.1 *Consideration of Alternatives*

The final preferred alternative that is being presented in this Environmental Impact Report have been determined based on the following:

LANDUSE

The current land zoning is agriculture and an application for mixed land use is relevant. Approximately 30 hectares of the total study area is undeveloped and vacant land, with a row of market stalls along the R104 close to the corner with the R513.

The proposed development site is privately owned by Shalimoq Investments CC who purchased this property specifically for the purpose of establishing a mixed land use township based on the need in the macro area. The site is deemed ideal for the following reasons:

- The location of the site is an obvious choice since it is located close to business and recreational development opportunities along the R104 (the old Rustenburg Road) and the R513 which links Brits and Magaliesburg. It will not result in leapfrog development.
- The proposed development is relative close to employment opportunities in the tourism, mining and agricultural sector.
- The Madibeng Local Municipality previously indicated that they could support this project in principle.
- The proposed project is in line with the municipal objectives for the macro area.

Based on the above it is suggested that the change of land use from agriculture to mixed landuse could be considered an obvious choice for the area. The loss of agricultural land would occur, but the land is at present not used for agricultural purposes and it should be weighed up against the need for a financial investment with economic, employment and housing opportunities in the macro area.

LAYOUT

Previously Authorised Site Development Plan

This layout plan was approved during the previous application made to the Madibeng Local Municipality. This plan represents maximum developmental use of the land which will ensure maximum economic feasibility and high profits. Refer to Appendix B for a copy of this layout plan.

A new layout plan was however compiled that reflects the following:

- Land use requirement of the new landowner, based on economics and market requirement
- Environmental Sensitivities as per updated environmental specialist reports.
- Current relevant environmental legislation

First Draft Township Layout as included in the Draft Scoping Report (based on findings of this EIA study)

The key factor for consideration in this layout is to ensure that the development will not take place in a manner detrimental to the riparian system and heritage resources that are present on the site:

- The Environmental Sensitivity Map provided in Chapter 4, Paragraph 4.3 must guide the layout of the township.
- The heritage resources as discussed in Chapter 4, Paragraph 4.4, with special emphasis on the small graveyard in the eastern corner of the site, must be provided for.
- The town planners are also establishing if there are any other restrictions (i.e. pipelines and road servitudes) that could influence the layout.
- Requirements from the landowners
- Relevant legislation

The layout represents the project components as discussed in Chapter 2, Paragraph 2.2.2 above. This layout takes into consideration the recommendations as made by both the ecologist as well as the heritage specialist and is therefore in line with the findings of the EIA study.

Second Draft Township Layout as included in the Final Scoping Report (based on findings of this EIA study)

The layout (attached as Appendix B3) is as above and includes the following changes:

- A meeting was held with the North West Province: Department of Public Works and Roads and they suggested that the access road closes to the 4-way stop on Road P251-1 be moved 150m to the north and this recommendation was now included.
- The access road at site where the hospital will be constructed was also moved approximately 150m to the east to allow for a safer ingress and egress.

Proposed Township Layout as presented in the Draft EIR (this report) (based on findings of this EIA study)

The layout (attached as Appendix B4) is as above and includes the following changes:

- The number of the 117m² two-bedroom private resort units was increased with 23 units (from 89 units to 112 units).
- Allowance was made for an access road of 4m wide to be used by large trucks for maintenance of the dam wall and outlet structures, specifically the large radial gates. The road will be controlled with a locked gate by DWS who will also be responsible for the maintenance of the road.
- The proposed built area increased from 60 000m² (6 hectares) to 100 000m² (10 hectares). This represents a total built area (footprint of hard surfaces) of ±10 hectares, which equates to a built area of only 33% of the total site. It is therefore estimated that approximately 67% of the total site will be either natural open space or landscaped indigenous gardens.

Conclusive statement in terms of alternatives

Three different layout alternatives were assessed during the course of this study:

- Previously Authorised Site Development Plan (previously approved by the Madibeng Local Municipality)
- First Draft Township Layout as included in the Draft Scoping Report
- Second Layout Alternative as included in the Final Scoping Report
- PROPOSED TOWNSHIP LAYOUT as presented in the Draft EIR (this report)

The PROPOSED TOWNSHIP LAYOUT as presented in this document ensures that the development is not detrimental to, amongst other, the riparian system and heritage resources that are present on the site:

- The Environmental Sensitivity Map provided in Chapter 4, Paragraph 4.3 guided the layout as proposed.
- The heritage resources as discussed in Chapter 4, Paragraph 4.4, with special emphasis on the small graveyard in the eastern corner of the site, are provided for.

The PROPOSED TOWNSHIP LAYOUT as presented in this document took into account the following:

- The access road to the dam structures to be used by DWS was provided for.
- The requirements as stipulated by the North West Department of Public Works and Roads regarding access roads were adhered to.
- There are no any other restrictions (i.e. pipelines and road servitudes) that influenced the layout.
- Requirements from the landowners were taken into consideration.
- Relevant legislation was taken into consideration.

The PROPOSED TOWNSHIP LAYOUT represents the project components as discussed in Chapter 2, Paragraph 2.2.2 above. This layout takes into consideration the recommendations as made by the ecologist, heritage specialist, the NW Province Department of Public Works and Roads, the Department of Water & Sanitation, relevant legislation as well as input received during the public participation process to date. The PROPOSED TOWNSHIP LAYOUT is therefore in line with the findings of this EIA study.

3.2 No Go Alternative

This is the “do nothing” alternative. Under these circumstances the residential township will not be established and the site of approximately 30ha will remain vacant for most part and will further deteriorate.

Vacant land in close proximity to work opportunities with easy access is generally always under threat of squatters and/or subsistence farmers with associated negative impact on the environment.

The No Go alternative is generally considered should the proposed development have a significant negative impact that cannot be adequately mitigated against. Issues further affecting this option may also emanate from opposition from I&AP's with due justification as well as non-compliance with certain legislative requirements of an organ of state. In the Environmental Impact Report an impact assessment will be done to confirm if all expected negative impact could be mitigated to acceptable levels. The Public Participation Process will also guide acceptability of the site for development. The legal requirement for development on the site will again be confirmed.

Given the site location, very good and convenient access, potential to connect to municipal services; and also considering it is a natural extension of residential land use in the macro area, it is the opinion of the EAP at this stage that a good business and development opportunity for both the Applicant and the municipality could be missed and the site would not be optimally developed if the No Go alternative is pursued.

CHAPTER 4: STATUS QUO OF RECEIVING ENVIRONMENT

4.1 *General Description of the Site and Study Area*

The study area falls within the Savanna biome and classified as belonging to the vulnerable Moot Plains Bushveld (SVcb 8) (Mucina & Rutherford 2006). The site is situated on the north-eastern corner of the R512 and the R104 crossing, where considerable development already exists. The property is situated on plains bushveld, in the buffer area of the Magaliesberg Biosphere Reserve but does not include the Magaliesberg.

The site is an open area with mostly natural vegetation that is in various conditions ranging from degraded to natural. A small, seasonally moist drainage line originates on the site and runs north-eastwards through the property, draining storm water from the catchment.

The site is located in an area surrounded by various developments that ranges from agriculture, residential to commercial.

Existing impacts on the site are:

- Various roads and footpaths transect the area
- Rubble and litter present in various locations
- Formal and informal houses and ruins of old houses
- Alien vegetation

North West Biodiversity Sector Plan

According to the Biodiversity Sector Plan (obtained from the South African National Biodiversity Institute (SANBI), the following applies (also refer to Appendix A for maps as obtained from the SANBI website):

- The site falls within a Critical Biodiversity Area 2
- The site is adjacent to a formal Protected Area (the Magaliesberg Biosphere Reserve)
- There are no rivers or wetlands on site
- The site is not identified as being Critically Endangered-, Endangered- or Vulnerable Ecosystem

Rainfall and temperature

Hartbeespoort normally receives about 559mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (0mm) in June and the highest (105mm) in January. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Hartbeespoort range from 19.2°C in June to 28.9°C in January. The region is the coldest during July when the mercury drops to 2.2°C on average during the night.

Elevation

The elevation profile shows the site to slope from north to south towards the central seasonal

drainage channel and from south to north towards the channel in the central part of the site. Then average slope ranges between 4.5%-2.6% with the maximum elevation 1202 and the lowest 1173.



Elevation profile of north to south section of the study area

The site also slopes from the southwest towards the north-east with an average slope of -4.5% with the elevation in the southwest being 1203 and the northeast 1143 with a fall of approximately 61m.



Elevation profile from southwest to northeast for the study area

4.2 Geotechnical and Geohydrological Aspects

An Initial Engineering Geological Investigation was conducted by Geoset cc and attached under Appendix C. A summary thereof follows below.

GEOLOGY

The site is underlain by Magaliesberg Formation Quartzite and Shale of the Pretoria Group, Transvaal Supergroup. Deposits of quaternary age consist of transported colluvium and alluvium from the steep slopes of the Magaliesberg Mountains, covering the lithology.

SOIL PROFILES

Typical expected soil profile on colluvium covering quartzite

Slightly moist, reddish brown, loose to dense, intact sometimes open textured clayey SAND with fine subrounded quartzite gravel and scattered angular quartzite boulders up to 400mm in diameter. Colluvium. Overall consistency is loose becoming dense.

Refusal on residual material may be encountered, specifically expected at the south-eastern portion towards the mountain slope, where quartzite outcrop is found.

Some problems regarding excavatability to a depth of 1,5m may be expected on the site, and some difficulty in excavation may be encountered in some test pits, towards the mountain where rock is expected at surface. To ensure the stability of excavations, it may need standard sidewall protection in excavations exceeding 1,5m.

EVALUATION FOR URBAN DEVELOPMENT

Seepage and the presence of perennial fluctuations of ground water may be encountered on site, and indicates that a seasonal perched water table may exist.

Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures, and the excessive erosion of this sandy gravel (with a lack of cohesion between the sand or fine gravel) material must be prohibited.

The site most probably contains moderate compressible or collapsible soils, with variable moisture content and foundations will need specialized treatment.

Some problems regarding excavatability to 1.5m depth can be expected on the site.

Retaining walls as well as slope stabilization measures are recommended on all constructed embankments exceeding 1,5m. Storm water diversion measures such as ponding pools are recommended to control peak flows during thunderstorms. All embankments must be adequately compacted and planted with grass to stop any excessive erosion and scouring of the landscape.

ZONATION FOR URBAN DEVELOPMENT

It is recommended to conduct a Phase 2 Engineering Geological Investigation before construction commences. The site will be divided into development zones by grouping together all the land facets with the same geotechnical characteristics. Each zone will be defined as a grouping of areas

with specific geotechnical properties placing similar constraints upon development. Typical development zones are:

- Land suitable for development
- Land suitable for development with precaution or risk
- Land not suitable for development

Foundations will specifically be designed after zonation has been completed.

Note: the need for zonation as mentioned above is stipulated in the Environmental Management Plan.

CONCLUSION

- The site was investigated to determine the expected engineering geological properties that will influence township proclamation.
- The site is underlain by Magaliesberg Formation Quartzite and shale of the Pretoria Group, Transvaal Supergroup.
- Some problems are foreseen regarding the excavatability to 1,5m depth.
- Zoning of the site may reveal three zones, with moderate constraints regarding the consolidation and collapsible fabric, excavatability of the soil, and the presence of a drainage feature.
- Modified normal and specialized construction techniques may be required to enable proper development.
- This investigation was done to reveal the preliminary geotechnical properties on site. Although every possible factor during the investigation was dealt with, it is possible to encounter variable local conditions. This will require the inspection of foundations by a competent person to verify expected problems.

GEOHYDROLOGY

A Hydrocensus letter was compiled by Geoset cc and attached under Appendix C. It stated the following:

- The site is underlain by Magaliesberg formation Quartzite of the Pretoria Group, Transvaal Supergroup, and a dolerite dyke towards the north. Typical shallow soil profiles were encountered, and it consisted of clayey sand with permeability expected to be low with slow seepage of effluent. The general depth of the water table is in excess of 50m, thus providing a buffer zone, should any leakage or spillage occur.
- A closed sewage system will be implemented and no leakage is expected from such a system with no possible ground water pollution envisaged.
- The necessity for a hydro census is not foreseen since these closed sewage systems will not have an influence on the environment.
- It is recommended that a water sample be taken and tested prior to the construction phase to serve as a reference should any future problems be encountered.

4.3 Ecological Report (Vegetation and Aquatic features)

A Plant Ecological & Wetland-Riparian Assessment was undertaken by Enviroguard CC and is attached under Appendix C. A summary thereof follows.

4.3.1 Vegetation

Vegetation type

The vegetation of the study is classified as belonging to the vulnerable Moot Plains Bushveld (SVcb 8) (Mucina & Rutherford 2006). The Moot Plains Bushveld is located in the Northwest and Gauteng Provinces occurring directly south and north of the Magaliesberg Mountains. The soil varies from colluvial clay-loam to red-yellow apedal freely drained.

The vegetation is open to closed low thorny savanna dominated by various *Acacia* species.

This vegetation type is regarded as being vulnerable with 13% of the target of 19% being statutorily conserved. It is estimated that approximately 28% of the natural vegetation has been transformed due to cultivation and urban development.

Vegetation Units

Six different vegetation units were identified on the property and are discussed below:

1. *Dichrostachys cinerea-Heteropogon contortus* woodland
2. *Hyperthelia dissoluta-Triumfetta sonderi* grassland
3. Drainage channel
4. *Vachellia tortilis-Berchemia zeyheri* woodland
5. *Combretum apiculatum-Senegalia caffra* woodland
6. Developed and degraded area



Vegetation units of the study are

Vegetation Unit 1: *Dichrostachys cinerea*-*Heteropogon contortus* woodland



Status		Degraded (bush encroachment)	
Vegetation structure:		Open to dense wood and shrubland	
Topography:	Slight western slope (1-20)	Soil	Loamy with some clay
Rock cover:		1%	
Need for rehabilitation		Medium-high	
Conservation Priority		Low-medium	

This woodland is located in the central-eastern section of the study area. The soil is brown loam with a moderate amount of leaf litter. Few rocks covering less than 2% are present and are small in size.

The vegetation is characterised by the prominence of shrub *Dichrostachys cinerea* with dense patches of the alien invasive *Lantana camara*, and the grasses *Heteropogon contortus* and *Eragrostis rigidior*. Other species present include the woody species *Senegalia erubescens*, *Senegalia burkei*, *Lippia javanica*, *Searsia leptodictya*, *Sclerocarya birrea*, the grasses *Hyperthelia dissoluta*, *Urochloa mosambicensis*, *Cynodon dactylon* and the forbs *Tagetes minuta*, *Talinum caffrum*, *Indigofera comosa*, *Leonotis dysophylla* and *Sida cordifolia*.

Red data species

No red data species were found and it is unlikely that they would be present due to the degraded condition of the area. Seedlings and a few medium-sized individuals of the protected tree *Sclerocarya birrea* are present in this unit.

Alien plants

Lantana camara, *Datura stramonium*, *Melia azedarach*, *Jacaranda mimosifolia*

Discussion

This unit is characterised by and open to dense woody layer that consists of a large number of the indigenous invader shrub *Dichrostachys cinerea* and the declared alien invasive shrub *Lantana camara*. These species have densified in large areas of this unit and is a result of previous disturbance of the area, most probably heavy grazing. The grass layer is well-developed and dominated by secondary successional grasses that form dense patches throughout the area. The area has a moderate-high species richness though most of the species are secondary successional species together with indigenous and alien invasive woody species. From a plant ecological and ecosystem functioning point of view this unit has a **low-medium conservation value**.

Vegetation Unit 2: *Hyperthelia dissoluta*-*Triumfetta sonderi* grassland



Status		Degraded	
Vegetation structure:		Tall grassland	
Topography:	Level with slight western slope (1-30)	Soil	Loam & gravelly
Rock cover:		3%	
Need for rehabilitation		High	
Conservation Priority		Low	

This unit occurs scattered in small patches in the south-eastern section of the study area. The soil is sandy with a gravelly texture.

The vegetation is characterised by the dominance of the tall grass *Hyperthelia dissoluta* and the forb *Triumfetta sonderi*. Other species present include the shrub *Lippia javanica*, the grasses *Aristida congesta* subsp. *congesta*, *Aristida scabrivalvis*, *Trichoneura grandiglumis*, *Heteropogon contortus*, *Aristida meridionalis*, *Pogonarthria squarrosa* and the forbs *Commelina Africana*, *Monsonia angustifolia*, *Solanum panduriforme* and *Vernonia oligocephala*.

Red data species

No red data species or suitable habitat was found to be present within this unit and it is unlikely that such species would be present due to the degraded condition thereof.

Alien plant species

Lantana camara.

Discussion

This unit occurs in three small sections in the south-eastern section of the study area. These areas have most probably been cleared for agricultural purposes in the past due to slightly deeper sand present. The vegetation has become dominated by the tall grass *Hyperthelia dissoluta* that typically become dominant in previously disturbed sandy areas. Remnants of old ruins and graves were found to be present within sections of this unit. The sections located towards the eastern part of the study area have also been prone to the dumping of rubble and litter with various informal roads traversing through these areas. The area has various open bare patches of soil with signs of mild erosion noted in some sections. The unit has a low species richness with most of the species being pioneer or secondary successional species. From a plant ecological and ecosystem functioning point of view this unit is regarded as having a **Low** conservation value.

Vegetation Unit 3: Drainage channel



Status	Natural to slightly degraded		
Vegetation structure:	Woodland		
Topography:	N/A)	Soil	Loamy to clay
Rock cover:	1%		
Need for rehabilitation	Medium		
Conservation Priority	High		

The drainage channel is located in the central part of the study area and stretches from west to east. The soil is grey to dark clay with large amounts of leaf litter. Large boulders occur scattered in assemblages throughout the area covering less than 10%.

The vegetation is characterised by a mixture of tall woody species including *Celtis africana*, *Searsia lancea*, *Olea africana* subsp. *africana*, with a shrub layer that includes *Dombeya rotundifolia*, *Vangueria infausta*, *Carissa bispinosa*, *Euclea crispa* and *Ehretia rigida*. The undergrowth is sparse as expected and include the grasses *Setaria lindenbergiana*, *Panicum maximum*, *Themeda triandra* and the forbs *Amaranthus hybridus*, *Pellaea viridis*, *Melinis repens* and *Tagetes minuta*.

Red data species

No red data species or suitable habitat was found to be present within this unit.

Alien plant species

Lantana camara; *Solanum mauritianum*; *Jacaranda mimosifolia*; *Melia azedarach*; *Cereus jamacaru*; *Agave americana*, *Xanthium strumarium*.

Discussion

This unit is a moderate to deeply incised channel with steep embankments Allocated in the central part of the study area. It receives surface water from the adjacent open areas and channels it north-east towards a concrete lines canal on the eastern boundary of the study area located below the Hartbeespoort Dam wall. In some areas of the channel large boulders occur that assist in breaking the force of the water. Whereas the surrounding terrestrial areas has a good

herbaceous cover that breaks the force of the water, the drainage channel’s herbaceous layer is not well-developed in some areas, mostly due to the dense tree layer and high canopy cover. Thus, water enters the channel system at a slow pace, that slightly increases once in the mostly bare channel. This is most probably the cause of the channel to be moderately deep incised due to previous erosion. The soil of the channel is humus rich, moist clay with some leaf litter present. The presence of the number of alien invasive species is alarming. The drainage channel provides an excellent way of dispersing their seeds towards areas further downstream of the site. The channel also provided habitat for various bird and insect species as well as some moist depending species. The area has a high species richness and although alien vegetation is present it is regarded as having a **high** conservation value and ecosystem functioning.

Vegetation Unit 4: *Vachellia tortilis*-*Berchemia zeyheri* woodland



Status		Natural	
Vegetation structure:		Open woodland	
Topography:	N/A	Soil	Loamy to clay
Rock cover:		10%	
Need for rehabilitation		Medium-high	
Conservation Priority		Medium-high	

This open to closed woodland is located in the northern section of the study area on loamy soil. Rocks are present in the form of small-medium sized pebbles.

The vegetation is characterised by the prominence of the trees *Vachellia tortilis*, *Berchemia zeyheri* and the grasses *Panicum maximum* and *Heteropogon contortus*. Other species present include the woody *Combretum apiculatum*, *Euclea crispa*, *Dichrostachys cinerea*, *Lanana discolor*, *Pappea capensis*, *Combretum zeyheri*, the grasses *Cynodon dactylon*, *Eragrostis curvula*, and the forbs *Talinum caffrum*, *Commelina erecta*, *Aloe davyana*, *Zinnia peruviana* and *Pentarrhinum insipidum*.
Red data species

No red data species were noted within this unit however, the protected tree *Sclerocarya birrea* is present within this unit.

Alien plant species

Lantana camara

Discussion

This unit is located in the northern section of the study area. The woody species are prominent forming an open to semi-closed canopy in places. The woody species are mostly taller than 4m with the grasses forming a dense herbaceous layer of medium-tall grasses. The area has some smaller patches that are degraded mainly due to human actions in the past. The unit has moderate-high species richness and from a plant ecological and ecosystem functioning point of view the area has **medium-high conservation value**.

Vegetation Unit 5: *Combretum apiculatum-Senegalia caffra* woodland



Status		Natural-degraded	
Vegetation structure:		Open to closed woodland	
Topography:	Slight to moderate western/eastern slope (2-50)	Soil	Loamy to clay
Rock cover:		1%	
Need for rehabilitation		Medium	
Conservation Priority		Medium-high	

This woodland is located along the western boundary of the study site as well as along the south-eastern boundary. The soil is shallow-medium deep and loamy.

The vegetation is characterised by the prominence of the trees *Combretum apiculatum*, *Senegalia*

caffra and *Combretum zeyheri*. The grasses *Panicum maximum*, *Heteropogon contortus*, and *Aristida diffusa* are dominant in patches throughout the herbaceous layer. Other species present include the woody species *Euclea crispa*, *Dombeya rotundifolia*, *Cussonia paniculata*, *Dichrostachys cinerea*, *Protea caffra*, the grasses *Aristida adscensionis*, *Tragus berteronianus*, *Urochloa mosambicensis*, *Melinis repens*, *Digitaria eriantha* and the forbs *Kohautia amatymbica*, *Ipomoea crassipes*, *Zinnia peruviana* and *Hermannia transvaalensis*.

This unit is divided into three sections namely 5a, b and c. Unit 5a is the more diverse and open woodland section, with 5b being degraded due to vagrants using the area, and unit 5c consisting of taller trees and a much more-dense and sometimes impenetrable section.

Red data species

No red data species or suitable habitat was found within this unit. Medium-sized individuals of the protected tree *Sclerocarya birrea* are present in this unit.

Alien plant species

Lantana camara, *Cereus jamacaru*

Discussion

This unit was previously used for cattle grazing. Thus, in some areas the vegetation is somewhat degraded however, the largest section is mostly natural. Various foot paths are present within the unit and the section closest to the corner of the R104 and the R521 is used by vagrants to travel through the area. Remnants of old buildings are also present in this section. The vegetation of this unit is similar to *Combretum apiculatum* communities elsewhere in the province in reserves and other natural areas. Unit 5a has an open woodland structure with a large variety of plant species. Unit 5b is similar to unit 5a, though it is more degraded due to various footpaths and vagrants using the area. In contrast unit 5c consists of much taller trees and are denser with impenetrable thickets in some areas. Unfortunately, the unit has been prone to illegal dumping of rubble and also areas where soil has been excavated and others dumped. This unit has a moderate-high species richness and from a plant ecological and ecosystem functioning point of view has a **medium-high conservation value**.

Vegetation Unit 6: Developed and degraded area



Status	Transformed		
Vegetation structure:	Developed / grassland / woodland		
Topography:	Mostly level	Soil	Loam
Rock cover:	3%		
Need for rehabilitation	High		
Conservation Priority	Low		

This unit occurs in the southern section of the study site.

The areas vary from informal to formal buildings, areas where rubble and litter is dumped, areas where informal businesses are established, old houses, remnants of old buildings and current residential house. The vegetation varies from totally destroyed to areas where the herbaceous layer has been destroyed, but with the woody species and alien species still present. Common species include *Senegalia caffra*, *Peltophorum africanum*, *Combretum zeyheri*, *Cynodon dactylon*, *Melinis repens*, *Hyparrhenia hirta*, *Tagetes minuta*, *Bidens pilosa*, *Epaltes gariepina*, *Alternanthera pungens*, *Tribulus terrestris* and *Gomphrena celosioides*.

Red data species

No red data species were found within this unit and it is highly unlikely that such species would be present due to the area being transformed.

Alien plant species

Lantana camara; *Cereus jamacaru*; *Jacaranda mimosifolia*; *Melia azedarach*; *Solanum mauritianum*, *Agave americana*.

Discussion

This unit comprises vegetated areas as well as developed areas where formal buildings and other structures are erected. The commercial buildings are mostly found in the south-western corner of the unit, while various other residential, old remnants of buildings and informal shelters are located spread through the rest of the unit. This area is characterised by various land use practices that include landscaped areas, areas where vegetation has been cleared and where informal businesses are located, and a network of foot paths. In one section an open/broken septic tank is present, while rubble and litter are present in other areas. There are some indigenous species present in this area, but they are mostly woody. The herbaceous layer is mostly degraded. This area is regarded as being degraded and from a plant ecological and ecosystem functioning point of view the area has a **low conservation value**.

MEDICINAL PLANTS

A total of seven (7) medicinal plants were found within the study area. None of the medicinal species are considered threatened and occur abundantly throughout the Province, while *Datura stramonium* is a category 1 declared weed.

CONNECTIVITY

The western and eastern sections of part of the study area has limited connectivity with and natural area due to commercial and agricultural activities along this boundary. The southern and northern sections have natural to semi-natural areas that borders onto the study site. The southern section has a tar road (R104) that separates the two areas, while further south the area becomes a mountain slope with different vegetation. The area to the north has direct connectivity with similar system although slightly degraded and relatively small and isolated due to developments.

PROTECTED SPECIES

The Department of Water Affairs and Forestry (now Department of Forestry and Fisheries) developed a list of protected tree species. In terms of Section 15(1) of the National Forests Act, 1998, **no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license or exemption granted by the Minister** to an applicant and subject to such period and conditions as may be stipulated. Trees are protected for a variety of reasons, and some species require strict

protection while others require control over harvesting and utilization. The Department of Agriculture, Forestry and Fisheries (DAFF) will have to be approached to obtain the required permits for the removal of any protected tree species.

Various individuals of the protected tree *Sclerocarya birrea* (marula) are present in the various units (1; 2; 4; 5). Permits for their removal must be obtained from DAFF for their removal. It is important that the importance of the natural environment is explained to all staff present as well as the reasons for not being allowed to damage or remove these species.

4.3.2 Aquatic features

No wetland was found to be present on the site. A seasonally moist drainage channel was identified, and its vegetation described under Vegetation Unit 3 above. A riparian zone delineation was done as indicated below.



Location of the seasonal channel as delineated (blue line)

Present Ecological Status (PES)

The results from the PES analysis for the channel area indicate it to be in PES class C (1.64) indicating that the system to be natural, but moderately modified with some loss in ecosystem functioning and biota. The natural habitat has mostly remained intact.

Ecological Importance and Sensitivity (EIS)

The Channel area achieved a **Moderate Ecological Importance and Sensitivity (EIS)** score of **1.68**. This is a value between 0 and 4, with 0 being very low and 4 very high. It is regarded as being

ecologically sensitive on a local scale though the vegetation is not affected negatively during high flow events. The channel although important in terms of its water channelling function also plays a role in removing some pollutants although on a small scale.

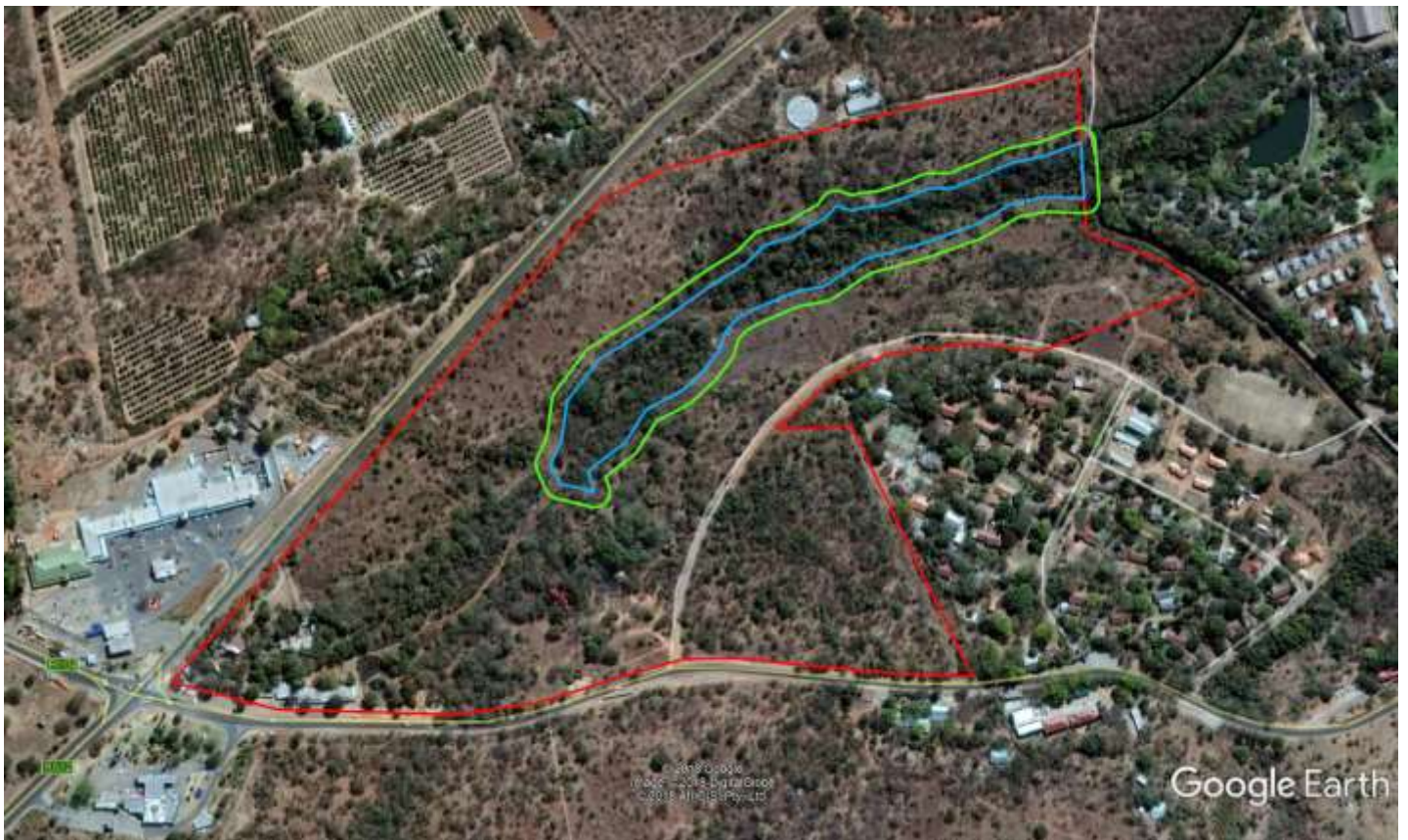
Habitat Integrity for the Riverine system (HI)

The channel achieved an HI score of Class C. This is a measure indication the degree to which a watercourse has been modified from its natural state. Class C means that the system is moderately modified and that although a loss and change of natural habitat and biota have occurred, that the basic ecosystem functions are still predominantly unchanged.

Discussion of Aquatic Features

A 15m buffer zone is recommended around the Drainage Channel areas (unit 3) and is indicated in below. The drainage channel area was assessed for its Present Ecological Status (PES), Ecological Importance and Sensitivity (EIS), and its Habitat Integrity (HI). All the scores achieved for these assessments indicate the total system to be moderately modified, though the habitat and ecosystem functioning is still natural with only a moderate loss in species and functioning. The drainage channel is therefore regarded as being ecologically sensitive at a local scale in that it channels water albeit towards a canal system and provides habitat for various animal species. The system only receives surface water from the small area surrounding the channel, thus it is thought that a buffer zone of 15m would be sufficient to protect the system. It is however, important that a proper management plan is implemented for the buffer zone area and that no unauthorised clearing of natural vegetation ever takes place in this area.

From an ecosystem functioning point of view, water systems are regarded as an important (crucial) component of the environment. The drainage channel plays an important role in providing habitat to various plant and animal species, a moderate to low role in water retention, a moderate role in removing pollution substances and an important role in water channelling that is important on a local scale. This area should therefore be regarded as having a **high conservation value**.



Recommended 15m buffer zone (green line) around the seasonal channel area

The geomorphology of the area (PES = A) is largely unaffected by the various human activities that took place in the past as well as the current activities (cultivation & forest plantations). Although some loss of natural vegetation has occurred, no large-scale changes of the topography have taken place.

The vegetation of especially the catchment and to a lesser extent the stream and wetland (PES = D) has been modified due to alien plant invasion in sections, the planting of crops, grazing, infrastructure development and forestry plantations. This has had a negative effect on the natural ecosystem in terms of plant species composition and succession. Most of the areas that have been left fallow and the remaining “natural” areas are regarded as being in an early to late successional phase. The alien plant species present in the wetland/stream area do pose a threat to the natural species and has already displaced many natural species in these sections.

The drainage channel received an EIS score of 1.61 and the system therefore has a moderate sensitivity. The system is therefore ecologically important and sensitive on a provincial or local scale. The biodiversity is not regarded to be negatively affected or sensitive to the surrounding anthropogenic activities.

It was not found that the instream Habitat Integrity was negatively affected on a large-scale. Although some small-scale changes in biota has most probably taken place, the area has an overall high ecosystem functioning and has remained mostly unchanged.

ECOLOGICAL IMPACT ASSESSMENT

Refer to Chapter 6 of this Report where impacts are assessed and mitigation measures provided.

The following impacts were assessed:

Fauna & Flora

- Loss of plant species
- Loss of rare/medicinal species
- Loss of animal species
- Loss of biodiversity
- Increased soil erosion
- Alien plant invasion

Aquatic Features

- Impedance/diversion of flow
- Direct modification or loss of aquatic habitat
- Water quality impact
- Stormwater management

Mitigation to manage / lessen these impacts is included in the Environmental Management Plan.

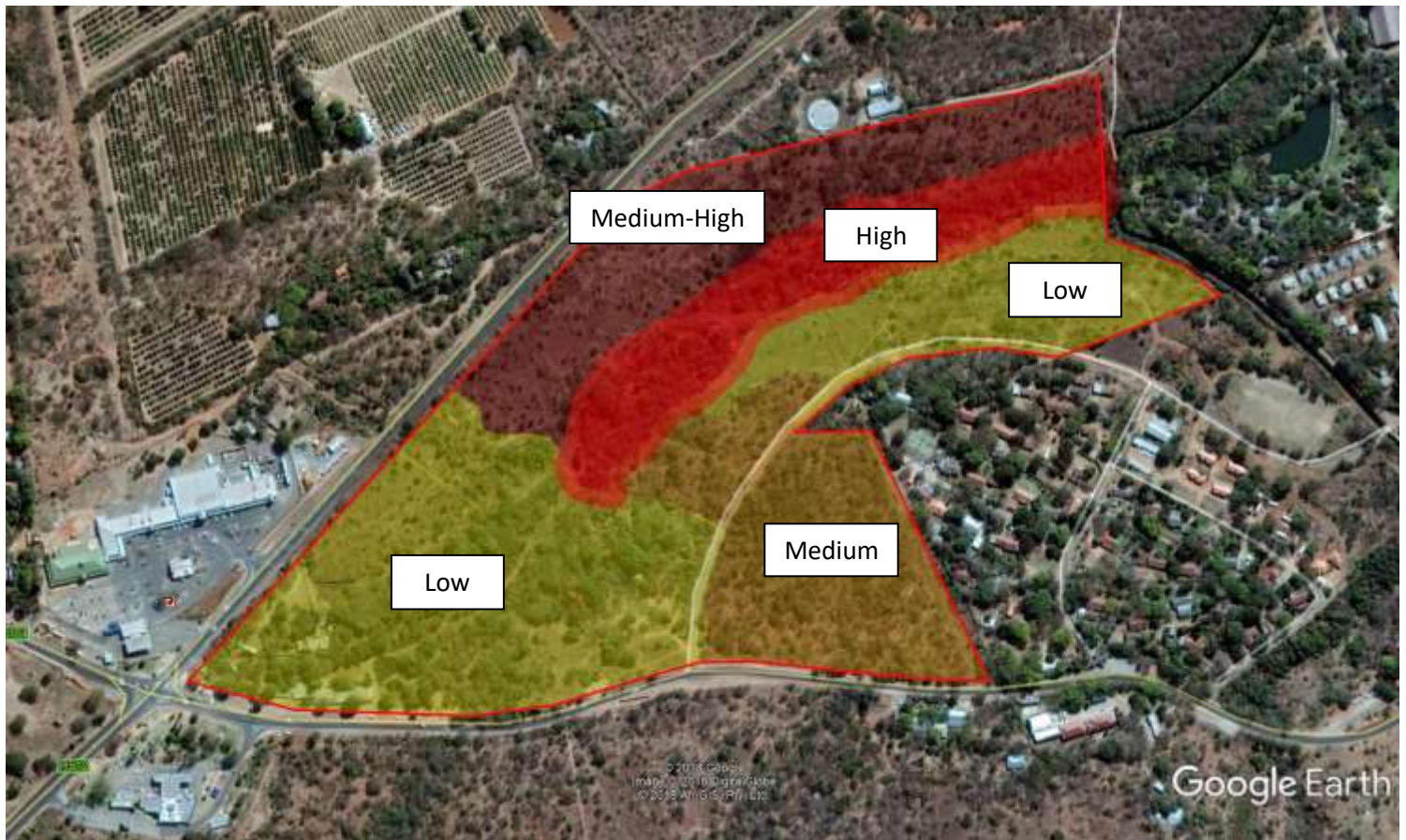
Risk Matrix as completed for the Water Use License Application

All impacts are expected to be *Low* except for the following impacts during the construction phase of the project, which was rated as being *Moderate*:

- Vegetation clearance within the drainage channel area
- Spread of alien plants
- Erosion of area

Mitigation measures that will manage these impacts have been supplied in the Environmental Management Plan.

4.3.3 Ecological Sensitivity Map



Sensitivity map for the vegetation units including the 15m buffer zone at the edge of the Drainage channel (Yellow = low sensitivity; Orange = medium; Maroon = medium-high; Red = high)

4.3.4 Conclusions and Recommendations

The study area is located in an area surrounded by various developments that ranges from agriculture, residential to commercial. The site is an open area with mostly natural vegetation that are in various conditions ranging from degraded to natural. Unfortunately, there are some effects on the vegetation as a result of human activities. The study site is mostly isolated from similar vegetation due to the development of the surrounding areas.

Vegetation Units

Vegetation Unit 1

- This unit borders onto the seasonally wet drainage channel in the north and on a residential/small holding development in the south.
- There are various indigenous woody species present including seedlings of the protected tree *Sclerocarya birrea* in this unit.
- The unit has a moderate species richness and is not thought to represent pristine vegetation and is therefore regarded as having a **low ecological sensitivity**.

Vegetation Unit 2

- This unit occurs in three small sections in the eastern part of the study area.
- The area has a low species richness and comprises pioneer and secondary successional species mostly with some signs of erosion present. This unit is regarded as having a **low ecological sensitivity**.

Vegetation Unit 3 (drainage channel)

- The seasonally moist drainage channel is located in the central part of the study area. The channel is deeply incised with a high woody cover and moderate herbaceous layer. The channel is mostly dry but receives and channels surface water during high rainfall events creating moist conditions during the wet season.
- This unit has a mostly natural plant species composition with good canopy cover and various medium to tall tree species present. As such it provides habitat for various faunal and bird species. The alien plant present within this unit is problematic and should be removed as a high priority to prevent them from increasing in number and also from spreading their seeds via the water. The water from this channel flows into a human-made concrete channel that is used to supply irrigation water to farmers further downstream.
- From an ecosystem functioning point of view this channel is thought to be **ecologically sensitive with a high sensitivity**. In order to protect the system from degradation, a 15m buffer zone is recommended around the edges of the channel where no development should take place.

Vegetation Unit 4

- This unit borders onto the seasonally moist drainage channel and is located north of the channel.
- The presence of large individuals of the important tree *Berchemia zeyheri* is characteristic. This tree is regarded as an ecologically important tree and is on the list of trees to be considered to receive protected status. The tree is important in that it provides edible fruit to various animals (e.g. monkeys, baboons, bushbabies, Grey louries, Green pigeons, barbets etc.) and also is browsable by antelope. The tree is also used for medicinal purposes in some areas.
- The tree *Vachellia tortilis* is also prominent in this unit.
- This vegetation unit also has direct connectivity with a similar although more degraded area towards the north and east. These few remaining areas are however small in size. From an ecosystem point of view this area is thought to have a **medium-high ecological sensitivity**.

Vegetation Unit 5

- Vegetation unit 5 is located in three sections on the study area. The vegetation of this unit is natural with a large number of climax and secondary successional species. Some sections are however, degraded due to human influences in the past and currently.
- Section 5a is more natural although the areas close to the road are degraded, but this

unit is also directly linked with vegetation unit 4 and therefore forms a large natural corridor.

- Unit 5b is more degraded with more pioneer and secondary successional species present. This unit is also very small and influenced by the shops and the road and is not deemed ecologically self-sustainable over the longer term.
- Unit 5c consists of natural sections with degraded areas in-between where rubble has been dumped and soil excavated.
- In terms of ecological sensitivity, unit 5a is regarded as having a **medium-high ecological sensitivity**, unit 5b a **low ecological sensitivity**, and unit 5c a **medium ecological sensitivity**.
- Any development in this unit (if approved), must ensure that the large individuals of the protected tree *Sclerocarya birrea* are not damaged as far as possible and they should be included in the proposed development plan.

Vegetation Unit 6

- Vegetation unit 6 is located in the southern part of the study area. This area has been heavily influenced by humans living in and utilising the area and the natural vegetation has become degraded.
- This area has a low species richness and is regarded as having a **low ecological sensitivity**.

Magaliesberg Biosphere Reserve

Although the development is situated within the demarcated buffer zone of the Magaliesberg Biosphere Reserve (also refer to Appendix A for maps indicating the site in relation to the core and transitional areas of the Biosphere), it is not thought that the development of sections of the study site would have a permanent negative effect on the ecosystem due to the study site being largely isolated due to surrounding developments. It is however, recommended that the sensitive areas as identified be kept as open natural spaces where the indigenous species can be conserved. It is also important that an ecological management plan be developed for these sensitive areas and actively managed and overseen by the owners of the proposed development.

Ecosystems

- Although large specimens of many tree species are present in the plant communities, no red data species occur here, and this bushveld ecosystem cannot be considered as rare, as it occurs widespread in the region. The most important ecosystem in the area is the Magaliesberg mountain. This area will not at all be affected, as the property is not situated on the mountain, but on the plains north of the mountain.
- Permits must be obtained for all individuals (seedlings to tall trees) of the protected tree *Sclerocarya birrea* that needs to be removed. It is not thought that the removal of seedlings of this tree would have any negative effect on the ecosystem, however large trees must be conserved as far as possible.

- Hiking trails could be developed in the natural areas that would enable people to enjoy the natural environment.
- All alien plant species in especially units 3, 4 and 5a must be removed and eradicated as a high priority.

Proposed development intensity

- High Ecological Sensitivity (Vegetation Unit 3: drainage channel)
 - These areas are ecologically valuable and important for ecosystem functioning. This land should be conserved and managed and is not suitable for development purposes.
 - A 15m buffer zone around the seasonally moist drainage channel has been demarcated and is included in the High Ecological Sensitivity zone.
- Medium-High Ecological Sensitivity (Vegetation Units 5a & 4)
 - Low-density development could be considered with limited impact on the vegetation / ecosystem. It is recommended that larger sections of the vegetation are maintained.
- Medium Ecological Sensitivity (Vegetation Unit 5c)
 - Medium density development could be considered with limited impact on the vegetation / ecosystem. Where possible certain sections of the vegetation could be maintained.
- Low Ecological Sensitivity (Vegetation Units 1, 2, 5b & 6)
 - Development could be supported with little to no impact on the natural vegetation / ecosystem.

4.4 Flood Lines Analysis & Determination Report

A flood line analysis was conducted by Civil Consult Engineers and is attached as Appendix C(3). A summary thereof follows.

General

A tributary of the Crocodile River intersects the Proposed Development from south-west to north-east. For the purposes of this section it will be referred to as Watercourse A.

Watercourse A originates approximately 1.3km south of the Proposed Development and is a non-sustaining watercourse in other words it only contains water during flash floods and during the wet season. It discharges through an existing 2x 800mm x 750mm portal culvert where it intersects with Road P2-4 (Watercourse B).

Watercourse A discharges the storm water run-off into the Crocodile River north-east of the site.

Catchment Areas

Catchment Area A

The total catchment area taken into account for Watercourse A is approximately 1.893km² and forms part of the Quaternary Drainage Region A21J as indicated by DWS.

The catchment area consists mainly of undisturbed natural bush, grass lands and mountainous terrains. Only a small portion of the undeveloped area within this catchment will be utilised for future development due to the fact that a large portion is classified as a protected by DEA.

Catchment Area A slopes generally $\pm 10.46\%$ from south to north.

Catchment Area B

The total catchment area taken into account for Watercourse B is approximately 0.721km² and forms part of the Quaternary Drainage Region A21J as indicated by DWS.

The catchment area consists mainly of undisturbed natural bush, grass lands and mountainous terrains. Only a small portion of the undeveloped area within this catchment will be utilised for future development due to the fact that a large portion is classified as a protected by DEA.

Catchment Area A slopes generally $\pm 16.61\%$ from south to north.

Calculations of flood peaks

The Rational Method from SANRAL: Drainage Manual, 6th Edition Fully Revised (2013) was used for the run-off calculations.

The calculated flood peak for Watercourse A is 48.52m³/s and 19.97m³/s for Watercourse B.

Description of Flood Plain

The flood plain of Watercourse A consists of Natural bush, Grassland and Eroded ravines

Conclusion

The 1:50 and 1:100 year flood line positions for Watercourse A were determined. Should any culvert crossings be constructed for roads crossing Watercourse A, a revised flood line determination and analysis report will have to be concluded.

Also note that a Water Use Licence Application was made to the Department of Water & Sanitation (submitted on 17 January 2019 and proof thereof attached in Appendix F). All conditions contained therein will be implemented by the Applicant before and during the construction period. This is also stipulated as such in the Environmental Management Plan.

4.5 Cultural Heritage Impact Assessment

A Heritage Impact Assessment (HIA) was required to ensure compliance with the National Heritage Resources Act because the project triggers the following relevant activities:

- The construction of a linear development (road, wall, power line canal etc.) exceeding 300m in length.
- Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof.
- Re-zoning of a site exceeding 10 000 m².

Dr Van Vollenhoven from Archaetnos Heritage Consultants compiled a HIA and concluded the following (also refer to Appendix C for a copy of the report):

During the survey eight sites of cultural heritage significance were identified and mitigation measures are proposed. After the implementation of these, the proposed development may continue.



The following is recommended:

Site 2 (a small graveyard)

A small grave yard (Site no. 2) was identified, and graves are always regarded as having a **high** cultural significance. The field rating thereof is Local Grade III B. It should be included in the heritage register but may be mitigated.

Two possibilities for mitigation exist:

- The first option would be to fence the graves in and have a management plan drafted for the

sustainable preservation thereof. This should be written by a heritage expert. This usually is done when the graves are in no danger of being damaged, but where there will be a secondary impact due to the development activities.

- The second option is to exhume the mortal remains and then to have it relocated. This usually is done when the graves are in the area to be directly affected by the development activities. For this a specific procedure should be followed which includes social consultation. For graves younger than 60 years, only an undertaker is needed. For those older than 60 years and unknown graves an undertaker and archaeologist is needed. Permits should be obtained from the Burial Grounds and Graves unit of SAHRA.

The type of development makes it possible to keep the graves *in situ*. An area of 225m² was zoned around the graves as a cemetery site (for existing graves only) and it will be fenced in. It is therefore recommended that it be included in the development planning and that Option 1 be implemented. This means that a management plan for the sustainable utilisation and preservation of the site needs to be drafted.

Sites 1, 3 and 4 (remains of stone and clay houses)

The remains of three stone and clay houses (Sites Numbers 1, 3 and 4) are those of workers dwellings. These are regarded as having a field rating of Local Grade IIIB. The sites should be included in the heritage register and may be mitigated (high / medium significance). Mitigation is subject to a permit application lodged with the relevant heritage authority. This implies that the sites may be demolished, but only after it had been documented. This documentation includes doing test excavations and drawing a site map. Since there are three of these structures it would be sufficient to mitigate only one. It is suggested that Site 1 be mitigated due to its close association with the graves.

Sites 5, 6, and 7 (remains of storage buildings)

Sites Numbers 5, 6 and 7 are the remains of large temporary storage buildings. These sites are regarded as having a field rating of Local Grade IIIC. The description in the Phase 1 heritage report is seen as sufficient recording (low significance) and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.

Site 8 (farm yard)

The farm yard (Site 8) is regarded as having a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording (low significance) and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.

The development may only continue after receiving the necessary comments from the BGG Unit of SAHRA and the North-West Provincial Heritage Resources Authority and implementing their decision.

It should be noted that the subterranean presence of archaeological and/or historical sites, features or artefacts is always a distinct possibility. It may only become known later on, therefore operating controls and monitoring should be introduced, aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.

FURTHER STUDIES / WORK REQUIRED

The following conditions for a Phase 2 Heritage Impact Assessment are included in the Environmental Management Plan which will form part of the conditions of the Environmental Authorisation:

- Site 2 (graves)
 - The graves must be kept *in situ*.
 - An area of at least 225m² must be fenced to ensure protection of the existing graves.
 - This area must be indicated as a separate erf in the Site Layout Plan and must have an appropriate zoning.
 - A management plan for the sustainable utilisation and preservation of the site needs to be drafted and submitted to SAHRA for their approval.

- Sites 1, 3 and 4 (remains of stone and clay houses)
 - The remains of all three stone and clay houses must be documented and included in the heritage register.
 - Due to its close association with the graves, it is recommended that only Site 1 be mitigated as per the following requirements:
 - Test excavations must be done
 - A site map must be compiled
 - All three structures may be demolished, but only after the above was done and after the necessary permit was obtained from the relevant heritage authority.

- Sites 5, 6, and 7 (remains of storage buildings)
 - Destruction of the sites may be granted at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.

- Site 8 (farm yard)
 - Destruction of the sites may be granted at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.

COMMENT FROM SAHRA

The Heritage Impact Assessment was uploaded on SAHRIS and comment from the South African Heritage Resources Authority (SAHRA) was received and the following was requested:

1. A Visual Impact Assessment
2. A Traffic Assessment on the historical Hartebeespoort dam wall
3. A Palaeontology Impact Assessment
4. The revised HIA must also note that once the vegetation is cleared, the number of graves must be verified by a qualified archaeologist.
5. A revised HIA that must assess the historical canals located on the north-east border of the proposed development.
6. All appendices and the final Scoping Report must be submitted along with the draft EIA and appendices at the start of the Public Review Period.
7. Comments from the North West PHRA must be obtained regarding sites 1, 3-8 (and the historical canals and dam wall) as these are protected under section 34 of the NHRA and do not fall within SAHRAs jurisdiction

RESPONSE

1. A Palaeontology Impact Assessment was conducted and is summarised below
2. A Visual Impact Assessment was conducted and is summarised below.
3. A Traffic Assessment was conducted and is summarised below.
4. It is noted in the revised HIA that once the vegetation is cleared, the number of graves must be verified by a qualified archaeologist.
5. The HIA was amended and reads as follows:
The aquaduct is merely an earth furrow dug from the river and running through the site. Due to it being totally overgrown it was impossible to take a photograph, but it is indicated on the 1:50 000 topographic map. It has no specific heritage characteristics apart from being associated with the Hartebeestpoort Dam water scheme.

The heritage feature (aquaduct) is regarded as having a field rating of Local Grade IIIB. It should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. In this particular case it could be used as part of the stormwater management plan of the township.
6. All appendices as requested will be uploaded onto SAHRIS together with the Draft EIA Report.
7. Comments from the North West PHRA was received and the following was stated:
An application form has to be completed and proof of payment need to be provided for structures older than 60 years e.g sites 1,3,4,8 and others including the historical canals and dam wall as these are protected under section 34 of the NHRA .

These requirements are included in the Environmental Management Plan.

4.6 Palaeontology Impact Assessment

A Palaeontology Impact Assessment was conducted by Prof Marion Bamford (attached under Appendix C) and is summarised below.

No fossils are preserved in the igneous rocks of the Vlakfontein subsuite but there is a very small chance that trace fossils might be found in the hard sandstones of the Magaliesberg Formation, such as *Manchuriophycus*. However, if fossils are found once excavations and building has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. As far as the palaeontology is concerned the project can proceed.

Chance Find Protocol as included in the Environmental Management Plan

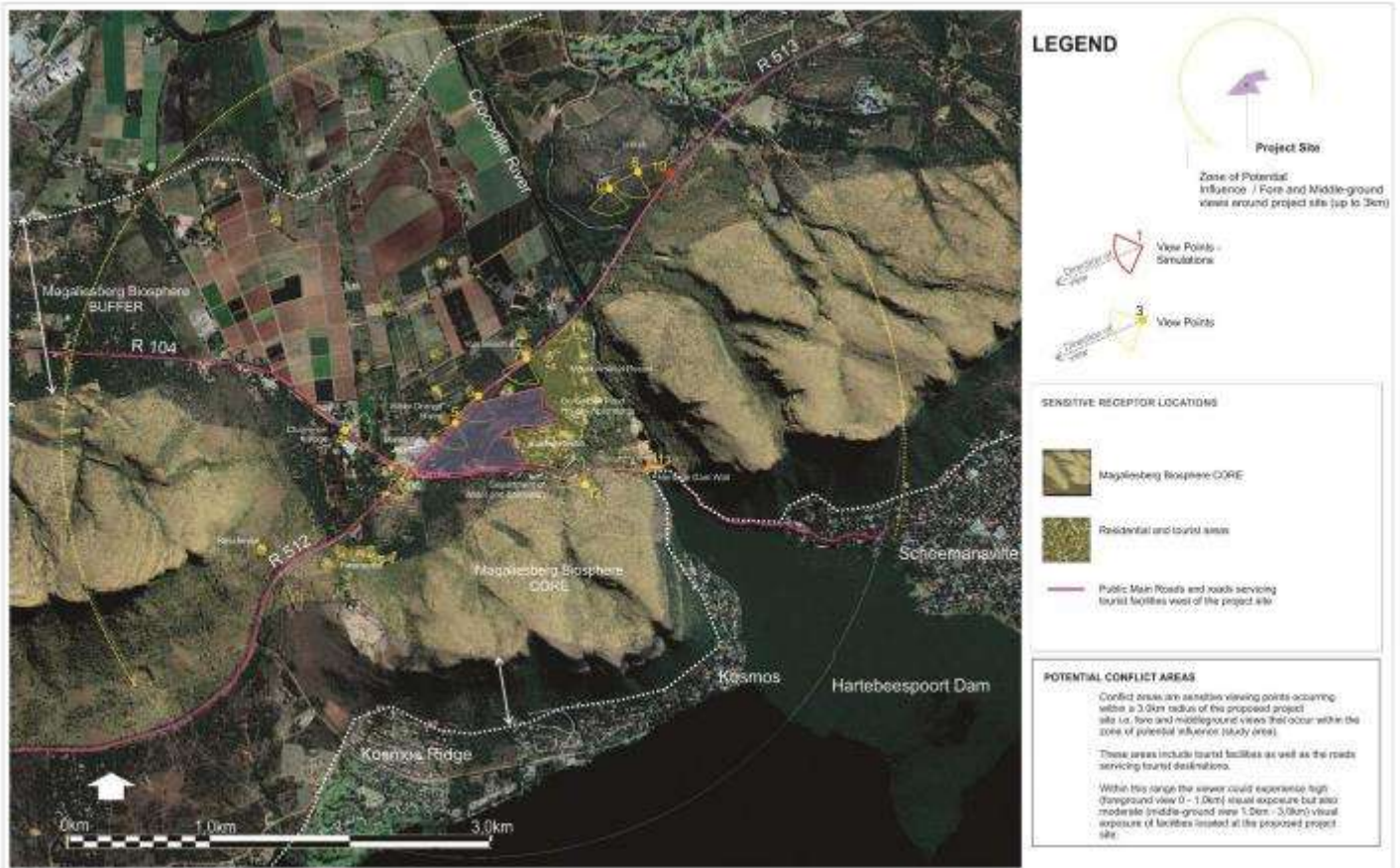
The following procedure is only required if fossils are seen on the surface and when excavations for foundations and infrastructure commence.

1. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils) should be put aside in a suitably protected place. This way the building activities will not be interrupted.
2. Photographs of similar trace fossils must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 4). This information will be built into the EMP's training and awareness plan and procedures.
3. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
4. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
5. Trace fossils (not mudcracks or ripple marks) that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
6. If no good fossil material is recovered then the site inspections by the palaeontologist will not be necessary. Annual reports by the palaeontologist must be sent to SAHRA.
7. If no fossils are found and the excavations have finished then no further monitoring is required.

4.7 A Visual Impact Assessment

A Visual Impact Assessment was conducted by *Graham A Young Landscape Architect* (included under Appendix C) and is summarised below.

View Sites and Sensitive Receptor Areas



Visual Resource Value / Scenic Quality

The scenic quality of the study area is primarily derived from the Magaliesberg mountain range along with its treed talus slopes which give the study area a distinct natural character and dramatic identity. The dramatic drop in elevation and flow of the Crocodile River immediately downstream of the dam wall also add to its identity. The mountain's profile is ever-present and forms the backdrop to most views experienced from the northern side of the mountain looking south. The scenic value of the area is a major contributor to a thriving tourist industry within the sub-region and contributes to the area's unique identity.

The north western section of the study area is dominated by agricultural activities that are mostly hidden from ground views from the two main public roads (R104 and R512/3) by vegetation adjacent to the roads. However, as soon as the viewer rises the slopes of the Magaliesberg the extent of these activities becomes evident. Compromising the natural/cultural character is the commercial tourist activities that occur along the R104 west and immediately east of the intersection with the R512.

An overall rating of *high* is allocated to the study area because of the overwhelming presence of the mountain. However, the nature and expansion of urban activity along the main roads is compromising the natural/wild beauty of the area as mentioned above. The project site lies within the area described as having moderate visual resource appeal.

Value of the Visual Resource

(After The Landscape Institute with the Institute of Environmental Management and Assessment, 2002)

High Magaliesberg mountain and Crocodile River Valley	Moderate Tourist resorts, residential areas, an agricultural land (includes the project site)	Low Urban areas associated with strip commercial and tourist development along the R104
<p>This landscape type is considered to have a <i>high</i> value because it is a: Distinct landscape that exhibits a very positive character with valued features that combine to give the experience of unity, richness and harmony. It is a landscape that may be of importance to conserve and which has a strong sense of place.</p> <p>Sensitivity: It is sensitive to change in general and will be detrimentally affected if change is inappropriately dealt with.</p>	<p>This landscape type is considered to have a <i>moderate</i> value because it is a: Common landscape that exhibits some positive character, but which has evidence of alteration / degradation/ erosion of features resulting in areas of more mixed character.</p> <p>Sensitivity: It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with</p>	<p>This landscape type is considered to have a <i>low</i> value because it is a: Minimal landscape generally negative in character with few, if any, valued features.</p> <p>Sensitivity: It is not sensitive to change in general and change</p>

Sense of Place

The sense of place for the study area derives from the combination of all landscape types and their impact on the senses. The Magaliesberg is the focus of the visual senses, making the study area unique within the sub-region, and consequently evokes a strong and dramatic sense of place to the study area.

Visual Receptors

Visual receptors include people living in, visiting or travelling through the study area primarily along the R104 and R512/3 main roads. The area is considered a tourist local destination area for visitors from Gauteng and North West Provinces.

Sensitive Viewers

The Magaliesberg is a protected environment and the visual resource responsible for a thriving tourism industry making any interventions to the existing situation potentially sensitive. The project site is located with the Magaliesberg Biosphere Reserve ‘buffer zone’ (Figure 3) and immediately adjacent its Core area.

The following receptors and viewing areas are considered as potentially sensitive to the proposed development. Potential conflict areas occur within a 3 km radius of the project site (i.e. fore and middle-ground views that could be affected by the proposed development). SARHA has identified the view from the historic dam wall as particularly sensitive as it is a tourist viewing site with dramatic views into the Crocodile River.

Potential Sensitivity of Visual Receptors

High	Moderate	Low
Residences and tourists visiting Hartbeespoort dam wall, the Magaliesberg Reserve and tourists visiting the study area	Locals travelling through the study area for business other than to visit a tourist destination	People working or travelling to work in the study area
Visitors of tourist attractions and travelling along local routes, whose intention or interest may be focused on the landscape; Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; Occupiers of residential properties with views affected by the development.	People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value); People travelling through or past the affected landscape in cars or other transport routes.	Visitors and people working within the study area and travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

The project site is located within a moderately sensitive landscape and adjacent to a highly rated landscape, and therefore the potential of visual impact must be considered, and that impact on the existing character of the landscape and sensitive should be prevented as far as is possible.

Visibility

The ‘zone of potential influence’ was established at 3,0km. Over 3,0km the impact of the Project’s

activities would have diminished as the project will recede into the background and/or views to the site (other than views from the Magaliesberg) would be screened by topographic relief, existing vegetation and structures.

In determining the visibility of the Project the most prominent aspects of the development are considered. The offsets, equivalent to the maximum height of proposed structures, were used to produce the viewshed. The viewshed (which was generated using contours only and did not include all off-site structures and vegetation) indicates that the proposed development would be highly visible for most areas within the 'zone of potential influence'. However, extensive tall tree cover creates a situation where most views to the site originating from sensitive viewing sites (other than elevated views from the Magaliesberg) would be screened. Visibility is therefore rated as low for 'ground level' views, since views would be obstructed or completely obscured and high for views from elevated positions on the Magaliesberg.

The Project would not be visible from the viewing site on the Hartebeespoort Dam wall as it would be screened by existing vegetation growing on properties east of the development site. Views from residential properties to the south and south west of the site would have elevated views of the project site but many of these would be partially or totally screened by existing tall trees.

The proposed development would be highly visible from the upper elevations of the Magaliesberg. However, it would be seen by relatively few people and it would always appear in the same visual envelope as existing development about the R104 and R512 intersection. Views from the Magaliesberg always comprise a combination of cultural, natural and man-made landscapes i.e. they are not of pristine or wilderness natural areas. The development would therefore not be out of place given this context i.e. the viewer would most likely not be sensitive to the development.

Visual Intrusion

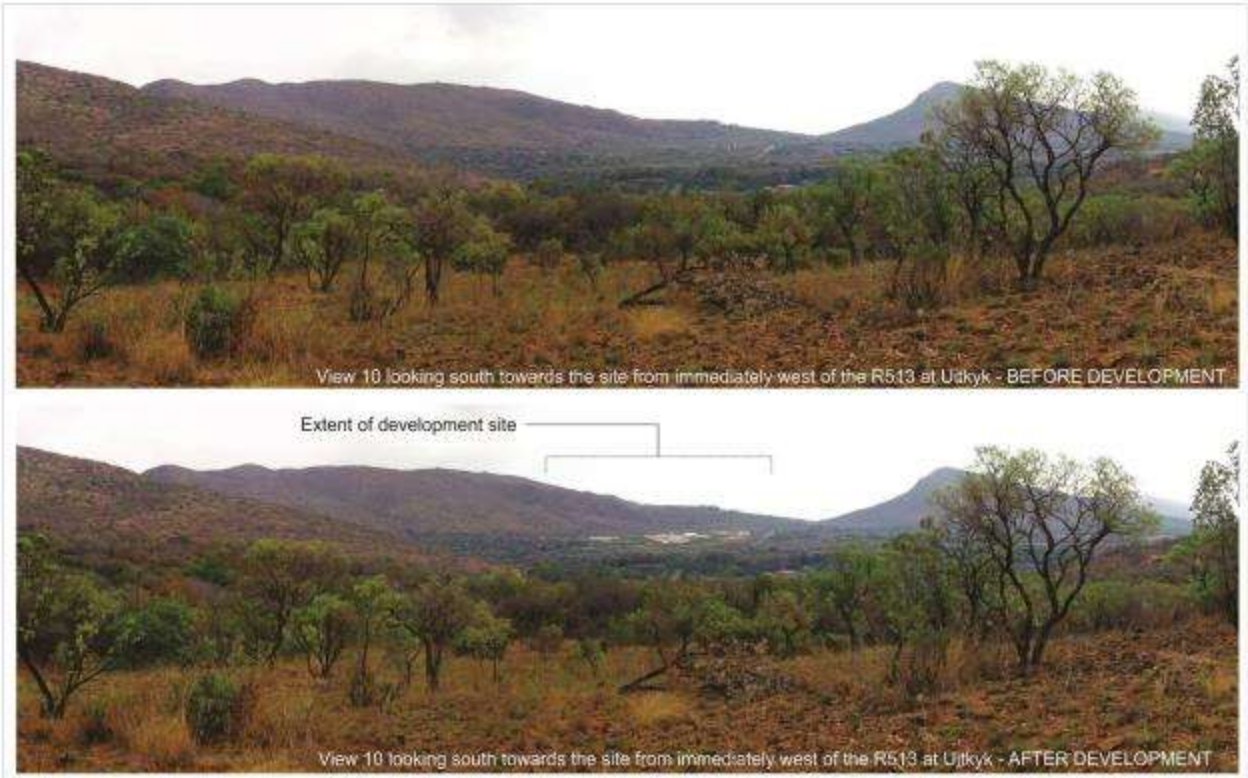
Visual intrusion deals with the notion of contextualism i.e. how well does a project component fit with or disrupt / enhance the ecological and cultural aesthetic of the landscape as a whole?

Visual intrusion is *moderate to low*. The development site is mostly compatible with the cultural aesthetic of the area (i.e. contained to an existing development node at the R104 and R512 that contains a variety of commercial and tourist facilities) and contrasts moderately with the patterns that define the landscape. Also, the extensive vegetative cover on the site and its immediate surrounds, tends to 'absorb' the development, assuming that all vegetation not directly related to building or infrastructural development is retained.

Visual Intrusion of the Proposed Development

High	Moderate	Low
<p>The development would have a substantial negative effect on the visual quality (sense of place) of the landscape relative to the baseline landscape because it would:</p> <ul style="list-style-type: none"> - Contrast with the patterns or elements that define the structure of the landscape; 	<p>The development project would have a negative effect on the visual quality (sense of place) of the landscape;</p> <ul style="list-style-type: none"> - Have a moderate negative effect on the visual quality (sense of place) of the landscape; - Contrast moderately with the current patterns or elements that define the structure of the landscape; - Be partially compatible with land use, settlement or enclosure patterns of the general area; 	<p>The development would have a minimal effect on the visual quality (sense of place) of the landscape;</p> <ul style="list-style-type: none"> - Contrasts minimally with the patterns or cultural elements that define the structure of the landscape; - Is mostly compatible with land use, settlement or enclosure patterns;
<p>RESULT: Notable change in landscape characteristics over an extensive area and an intensive change over a localized area resulting in major changes in key views.</p>	<p>RESULT: Moderate change in landscape characteristics over a localized area resulting in a moderate change to key views.</p>	<p>RESULT: Minimal change resulting in a minor change to key views from the tourist and residential areas in Hartebeesfontein area.</p>

Looking south towards the site



Looking west to the site from the Hartbeespoort Dam Wall



Conclusion of Visual Impact Assessment

The study areas scenic quality has been rated *high* within the context of the sub-region and sensitive viewing areas mapped indicating potential sensitivity to the proposed development within a 3 km radius of the development site. Impacts to views are the highest when viewers are identified as being sensitive to change in the landscape, and their views are focused on and dominated by the change. Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or from tourism / conservation areas, travel routes, and important cultural features and historic sites, especially in foreground views.

However, sensitivity to this development is *low* and the intrusive nature of project components is also rated *low* as the project will be mostly screened and absorbed into the landscape scene by existing vegetation and topography. The development would be seen from sensitive viewpoints on the upper slopes of the Magaliesberg. However, from these vantage points the development would always appear in the same visual envelope as other developments that define the cultural characteristic of the landscape and not appear out of place. SAHRA voiced a concern that the project could impact on views from the historic Hartebeespoort dam wall. Simulation modelling, however, indicates that the development would mostly be screened and would its physical presence would therefore not have a significant impact on tourists visiting the dam wall.

It is therefore predicted that *low* (i.e. a minor loss of or alteration to key elements / features / characteristics of the baseline) visual resource impacts would result from the construction, operation and maintenance of the proposed development. All aspects of the development, from a potential visual impact perspective, should be approved provided that the mitigation / management measures are effectively implemented, managed and monitored in the long term and that engagement with the community during this process is continued.

4.8 Traffic Impact Study

A Traffic Impact Study was conducted by CivilConsult Engineers and is attached as Appendix D(5). A brief summary thereof follows below.

The purpose of this study was to consider the traffic impact of the proposed development, due to the additional traffic that will be generated on the surrounding road network as well as on the development site. This was in accordance with the TMH (Technical Methods for Highways) 16 Volume 1 and 2, South African Traffic Impact and Site Impact Assessment Standards and Requirements Manual by the South African Committee of Transport Officials (COTO).

Road Network

Different sources revealed different names for some of the roads within the study area. In order to avoid any confusion, it was decided to refer to the names and numbers of the different roads as presented on page 6 of the TIS.

Key Conclusions and Recommendations

- There are existing approved land use rights on the development site, which were never implemented. The newly proposed land use rights of the development will replace the existing approved rights on the site and consist of a mixed land use township;
- No information could be obtained on latent rights that needed to be considered for this study;
- The capacity analysis was conducted for the base year (2018) and a five year horizon/ future year (2023) scenario;
- National Road Network Planning
 - The N4 runs in an east-west direction approximately 5km north of the development site and outside the study area for the TIS. However, the construction of the PWV 3 link between the R560 (K14 or P123/1) that links up with the N4 is under construction;
 - It was assumed that the link will be complete within the next five years. However, since no estimations could be obtained regarding the traffic once the link is completed, it could not be considered for the future year capacity analysis. The road is currently closed at the position at the southern start of the link (which was surveyed and analysed as *Intersection 4* in the report).
 - Once the PWV 3 link is completed with the two associated interchanges, the through traffic along this route will probably reduce. However, the development will also attract some of this traffic due to the various land uses it will incorporate and therefore the future year capacity analysis was conducted with a normal growth in the background traffic;
- Provincial Road Network Planning
 - The NWDPWT were contacted to discuss the development and it was indicated that roundabouts will be preferred as intersection control measures at the access positions to the development site. Unfortunately, the basic planning of the provincial roads, especially the planning for the closest intersection of the R104/ R513 (Road P251-1), could not be obtained to be considered for the TIS.
- Development Access
 - Four accesses are proposed to the development site of which all are T-junctions with roundabouts as intersection control measures. The access positions are indicated in Figure 9 of the TIS and detail on the proposed configuration can be seen on the conceptual design of the road upgrades surrounding the development in Figure 22 of the TIS.
 - The required access and intersection spacing according to the RCAM document is detailed in Table 3 of the TIS. The following conclusion can be made regarding the spacing of the proposed access positions:
 - The spacing along Road P2/4 between *Intersection 1* and *Access 2* as well as between *Access 1* and *Access 2* are both more than 240m and thus meets the minimum spacing requirement.
 - The spacing along the R513 (Road 251-1) between *Intersection 1* and *Access 3* is 304m and falls 36m short of the minimum spacing requirement. The spacing between *Access 3* and *Access 4* is 336m and falls 4m short of the minimum

spacing requirement of 340m which is deemed insignificant.

- The location of *Access 3* was determined in making optimum use of the feasible land which can be developed on the western side of the Green Zone (watercourse) that traverse the development site. Furthermore, it is situated approximately 144m from the access on the opposite side of the road to Damdoryn Junction which is more than adequately outside the influence area of that access. And lastly, since roundabouts are proposed as access controls at all the accesses as well as at *Intersection 1*, it will also serve as a traffic calming measure to a certain extent. Given these facts, the spacing of *Access 1* is deemed sufficient from *Intersection 1*.
- None of the accesses meet the requirement in any direction for left – or right-turn GASD for a WB-20 truck.
- The fact that there are GASDs that is not met for right- or left-turning vehicle types, is not considered to be critical. This is due to the fact that the proposed configuration for all the development accesses, as well as the road upgrade for *Intersection 1*, are roundabouts.
- The proximity of the roundabouts to each other and the associated entry speed of traffic approaching these roundabouts will be significantly lower than the design - and current operating speed on the two roads. The roundabouts will in effect also serve as traffic calming measures and improve traffic safety.
- The total new trips generated by the proposed development are 837 during the AM -, 1631 during the PM – and 1687 during the Saturday peak hours respectively. The PM – and Saturday peak hour generates almost double the number of trips than the AM peak hour, therefore the PM – and Saturday peak hours were selected to conduct the capacity analysis.
- The capacity analysis was conducted with SIDRA 6.0 software for the base year (2018) and future year (2023) scenario. The following fifteen intersections were analysed for the PM – and Sat peak hour respectively:
 - Intersection 1: R104/ R513 (Road P251-1);
 - Intersection 2: R104/ R512 (Development Access);
 - Intersection 3: R512/ Simon Bekker St;
 - Intersection 4: R512/ R560;
 - Intersection 5: Scott St/ Harrington St;
 - Intersection 6: Scott St (Tielman St)/ Road P2/4;
 - Intersection 7: Tielmann St (Beethoven St)/ R511 (Bach St);
 - Intersection 8: R511/ Road P2/4;
 - Intersection 9: R511/ R514;
 - Intersection 10: R511/ Road P251-1;
 - The Hartbeespoort Dam Wall;
 - Development Access 1;
 - Development Access 2;
 - Development Access 3; and
 - Development Access 4.

Capacity Analysis Conclusions

- The following road upgrades are required to be implemented by the developer:
 - Conversion of *Intersection 1* to a roundabout;
 - Implementation of roundabouts as intersection control measures at all four development accesses;
 - It is proposed that the implementation of a staged crossing for the side road traffic to enter the free-flow traffic stream be evaluated at *Intersection 10*. This can seemingly be achieved by amending road markings on the R511.
- The following road upgrades are required to be implemented by the relevant road authorities:
 - The conversion of *Intersection 5* to a mini-circle;
 - The implementation of a traffic signal with the necessary additional turning lanes at *Intersection 7*;
 - It is proposed that the implementation of a staged crossing for the side road traffic to enter the free-flow traffic stream be evaluated at *Intersection 8*.
- The conclusion on the impact of the development traffic on the dam wall is as follows:
 - The increase in average delay experienced for all vehicles in the base – and future year scenarios, due to the addition of the development traffic is deemed acceptable and should not have a detrimental effect on the dam wall per se.
- Public Transport Conclusion
 - The area surrounding the development has no formal public transport facilities of any kind. It is recommended that the necessary road authorities investigate this as a matter of priority.
- It is proposed that the development provide a formal walkway along the most part of the development boundaries with Road P2/4 and the R513 (Road P251-1). Furthermore, that a bus/taxi bay is provided in front of the shopping centre (Erf 58) downstream from *Intersection 1* along Road P2/4.

Based on the findings of this TIS and the summarised conclusions discussed above, it is recommended that the mixed-land use township known as *NW Gateway Extension 2* be supported from a traffic engineering point of view on condition that the following road upgrades, with all the necessary road widenings as indicated in in the conceptual design be implemented:

- Conversion of *Intersection 1* to a roundabout;
- Implementation of roundabouts as intersection control measures at all four development accesses;
- That the implementation of a staged crossing for the side road traffic to enter the free-flow traffic stream be evaluated at *Intersection 10*. This can seemingly be achieved by amending road markings on the R511;
- That a formal walkway be provided along the most part of the development boundaries with Road P2/4 and the R513 (Road P251-1); and
- That a bus/taxi bay be provided in front of the shopping centre (Erf 58) downstream from *Intersection 1* along Road P2/4.

4.9 Socio-Economic Environment

The Madibeng Local Municipality is a Category B municipality located in the North West Province within the Bojanala Platinum District. It is situated between the Magaliesberg and Witwatersrand, 60km from Rustenberg and 50km north of Pretoria. It is one of five municipalities in the district.

It is strategically located in relation to Gauteng, Limpopo, Harare and the Maputo Harbour, and is positioned along the Heritage Route, linking the World Heritage Site with the Pilanesberg and Madikwe Game Reserves.

It is known for its diversified economy. Currently, mining is the predominant economic activity, and the Hartebeespoort Dam is the second most visited place after the Waterfront in Cape Town.

Main Economic Sectors: Mining, manufacturing, agriculture, tourism

The demographics of the Madibeng Local Municipality are as follows:

	2016	2011
Population	536 110	475 796
Age Structure		
Population under 15	29.4%	25.7%
Population 15 to 64	65.9%	69.3%
Population over 65	4.7%	5.0%
Dependency Ratio		
Per 100 (15-64)	51.8	44.4
Sex Ratio		
Males per 100 females	115.4	113.7
Population Growth		
Per annum	2.71%	n/a
Labour Market		
Unemployment rate (official)	n/a	n/a
Youth unemployment rate (official) 15-34	n/a	n/a
Education (aged 20 +)		
No schooling	5.1%	7.6%
Matric	32.2%	27.1%

	2016	2011
Higher education	6.8%	7.2%
Household Dynamics		
Households	193 364	160 041
Average household size	2.8	2.9
Female headed households	29.5%	30.2%
Formal dwellings	63.3%	59.0%
Housing owned	67.7%	54.0%
Household Services		
Flush toilet connected to sewerage	27.3%	27.3%
Weekly refuse removal	35.5%	25.8%
Piped water inside dwelling	16.0%	22.3%
Electricity for lighting	88.0%	80.9%

CHAPTER 5: PUBLIC PARTICIPATION

5.1 Objectives of the Public Participation Programme

The main aim of public participation is to ensure transparency throughout the EIA process. The objectives of public participation in this EIA are the following:

During the Scoping Phase

- To identify all potentially directly and indirectly affected stakeholders, government departments, municipalities and landowners;
- To communicate the proposed project in an objective manner with the aim to obtain informed input;
- To assist the Interested & Affected Parties (I&AP's) with the identification of issues of concern, and providing suggestions for enhanced benefits and alternatives;
- To obtain the local knowledge and experience of I&AP's;
- To verify that the concerns and issues raised by I&AP's define and guide the scope of further studies to be undertaken during the Impact Assessment;
- To ensure that all reasonable alternatives are identified for assessment in the EIA Phase.

During the Environmental Impact Assessment Phase

- To communicate the progress of the EIA study as well as the proceedings and findings of the specialist studies;
- To ensure that informed comment is possible;
- To ensure that all concerns, comment and objections raised are appropriately and satisfactorily documented and addressed;

5.2 Process Followed

Significant measures were taken to ensure that all stakeholders and I&AP's were informed of the project and were allowed the initial opportunity to place their concerns and comment on record.

The Public Participation Process (PPP) followed during the Scoping Phase is summarised as follows:

First Phase Notification/Advertisement of the project

- *List of Interested & Affected Parties (I&APs)*
All potential directly and indirectly affected landowners, stakeholders and government departments were identified. The list is included in Appendix E(1) of this report.
- *First Phase Notification: Distribution of Background Information Document*
A Background Information Document (BID) was compiled and distributed via email on 15 June 2018. This BID as well as proof of distribution is included in Appendix E(2).

- *Onsite notices*

Two A2 laminated onsite notices (in English) were placed on 19 April 2018 along both the R104 and the R513. Proof of placement is included in Appendix E(3).

- *Newspaper advertisement*

An advertisement was placed in Die Kormorant local newspaper on 19 April 2018. Proof of placement is included in Appendix E(4).

Distribution of the Draft Scoping Report

The Draft Scoping Report was distributed for a 30-day commenting period (July/August) as follows (proof of distribution is attached as Appendix E.7):

- Hard copies of the report were sent via courier to:
 - Madibeng Local Municipality
 - Department of Water and Sanitation
 - North West Provincial Heritage Authority (NWPHRA)
 - The Draft BAR was linked to the SAHRIS website of the South African Heritage Resources Agency (SAHRA) for their perusal and comment.
 - Ms Annie Snyders: Site manager for tenants on the development site
- All registered Interested and Affected Parties was informed via email / post that the Draft Scoping Report could be viewed on www.landcapedynamics.co.za and where a hard copy of the report was available for perusal.

Final Scoping Report

Comments received on the Draft Scoping Report were incorporated into the Final Scoping Report and was submitted to NW READ and received by them on 9 October 2018. The Scoping Report and Plan of Study for the EIA were approved by the Department on 14 January 2019.

Focus Group Meeting(s)

No focus group / public meetings were held during the Scoping Phase of the project. Very little comment was received to date and at this stage public / focus group meetings are not deemed necessary.

A site meeting and site investigation with the NW READ Biodiversity Section was however held on 20 November 2018. Please refer to paragraph 5.3.4 *Comment Received on the Final Scoping Report* hereunder for detail in this regard.

The Public Participation Process (PPP) followed during the Environmental Impact Assessment Phase is summarised as follows:

Distribution of the Draft Environmental Impact Report

Comment received after the submission of the Final Scoping Report was included in the Draft EIR, which was distributed to all I&AP's for a 30-day commenting period (February / March) (proof of distribution is attached as Appendix E.10). Comment received on the Draft EIR is included in the Final EIR (this document) which is now submitted to NWREAD for their perusal and ultimately the issuing of the Environmental Authorisation.

Focus Group Meeting(s)

No focus group / public meetings were held during the EIA Phase of the project. Very little comment was received and public / focus group meetings were not deemed necessary.

5.3 Issues Raised During the Scoping Phase

5.3.2 Written Communication during the Initial Advertising Period up to the Distribution of the Draft Scoping Report

Comment had been received from the following stakeholders and is described and addressed below (also refer to Appendix E6 for copies of the correspondence):

Eskom Way Leaves NW Operating Unit: Mbengeni Tshidzumba

The proposed development affects LEFCO/SIELING 11KV and LSG48,2/4/1-LSG48/2/8/8 conductors. Eskom Distribution will raise no objection to the proposed application, provided that Eskom's rights and services are acknowledged and respected at all times.

1. There is a 9m building and tree restriction on either of the centre line of the 11kV power lines and must be adhered to at all times.
2. All work within Eskom's servitudes must be done in accordance with the Occupational Health & Safety Act No 85 of 1993 as amended.
3. Eskom Distribution's services and equipment must be acknowledge at all times and may not be tampered or interfered with.
4. Stipulations in Regulation R15 of the Electrical Installations Regulations must be adhered to.
5. The Applicant's and Eskom's cables must be placed in sleeves encased in concrete across the width of the servitude, at the Applicant's expense.
6. Eskom Distribution shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of encroachment or the use of the area where Eskom has its service.
7. The Applicant indemnifies Eskom against loss, claims or damages including claims pertaining to interference with Eskom Distribution services or apparatus or otherwise.

8. No mechanical equipment may be used within Eskom's reserve area, or within close proximity thereto, without Eskom's written permission.
9. Permission must be obtained at least 10 working days prior to the commencement of any work within the reserve area.
10. Eskom Distribution shall at all times have unobstructed access to and egress from its services.
11. The Applicant must familiarise him/her self with all safety hazards related to electrical plant.
12. Eskom's consent will not relieve the applicant from obtaining the necessary statutory, land owner or municipal; approvals.
13. Any third party servitudes encroaching on Eskom servitudes shall have to be registered against the property at the applicant's own cost.
14. Effective management and handling of waste is of crucial importance.
15. No blasting is permitted. If blasting is needed, an additional application is to be lodged with Eskom Distribution.
16. Any development which will necessitate the relocation of Eskom services will be to the account of the developer.
17. Eskom will recover costs from the Applicant where any damages of Eskom assets and or any penalties suffered by Eskom occur. Should the Applicant or his contractor damage any of Eskom services, then Eskom's 24 hour Contact Centre (086 000 1414) must be notified immediately.

Response from Landscape Dynamics

- *Eskom's requirements will be included in the Environmental Management Plan.*

SAHRA: Ms Natasha Higgins

A Background Information Document was received by SAHRA but they stated that all applicable reports must be loaded onto SAHRIS before they can comment.

Response from Landscape Dynamics

- *Comment noted*

Du Randt & Du Preez Inc: Mr Jacques du Randt

Mr Du Randt, as duly appointed attorney for the Managing Agent of Mount Amanzi Share Block (Pty) Ltd, requested to be registered as an I&AP.

Response from Landscape Dynamics

- *The I&AP register was accordingly amended*

Magaliesberg Protection Association: The Secretary: Ms Barbara Reid

She confirmed that the BID was sent out to their committee for comment and will inform us accordingly.

Response from Landscape Dynamics

- *Comment noted*

The South African National Roads Agency (SOC) Limited: Secretary Typist: Ms Ria Barkhuizen

It was confirmed that the NRA has no objection to the proposed development as it does not affect a national route or interchange.

Response from Landscape Dynamics

- *Comment noted*

Ms Annie Snyders: Site manager for tenants on the development site

She confirmed that the notification email was received.

Response from Landscape Dynamics

- *Comment noted*

Magaliesberg Biosphere NPC: The co-ordinator: Ms Belinda Cooper

She requested to be added to the IAP Register.

Response from Landscape Dynamics

- *She was added to the register.*

Mountain Club of SA: Ms Otti Nesor

She wanted to know if the Township will be a high cost, medium or low cost township; and high density? Will Mt Amanzi or other existing venues be incorporated into the project? They are still debating if the MCSA needs to participate.

Response from Landscape Dynamics

- *It will definitely not be a low cost township. The plans are to establish a hotel with a step-down clinic and residential units ranging from low to a higher density, also a retirement village.*
- *The Draft Scoping Report will be distributed for comment.*
- *All key stakeholders such as the MCSA will be kept on our IAP list and will not be deleted unless specifically asked to do so.*

Mountain Club of SA: Ms Otti Nesor (further correspondence)

The MCSA is concerned about a large township development right on the boundary of the Magaliesberg Protected Environment (MPE). A Google Earth image showing the border of the MPE was attached. It is a very important consideration, as the MPE is now also the Core Area of the Magaliesberg Biosphere Reserve under UNESCO. Developments in the Buffer Zone of the Biosphere are also subject to restrictions. A large township development would not be a suitable kind of development.

The UNESCO description of a Biosphere Reserve:

- The core area(s) comprises a strictly protected ecosystem that contributes to the conservation of landscapes, ecosystems, species and genetic variation.
- The buffer zone surrounds or adjoins the core areas, and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.
- The transition area is the part of the reserve where the greatest activity is allowed, fostering economic and human development that is socio-culturally and ecologically sustainable.

Response from Landscape Dynamics

An ecologist was appointed to undertake an in-depth impact assessment of the proposed development, specifically looking into the connectivity of the site with the MPE and surrounding areas. The study stated the following:

“The western and eastern sections of part of the study area have limited connectivity with a natural area due to commercial and agricultural activities along this boundary. The southern and northern sections have natural to semi-natural areas that borders onto the study site. The southern section has a tar road (R104) that separates the two areas, while further south the area becomes a mountain slope with different vegetation. The area to the north has direct connectivity with similar system although slightly degraded and relatively small and isolated due to developments.”

The MCSA is also requested to consider the following :-

There is a residential township (belonging to the Department of Water & Sanitation) bordering the south-eastern border of the site, blocking connectivity to that part of the MPE. On the other side of the busy R104 are farm fences, which reduce connectivity to that part of the MPE.

It is also important to note that the buffer area in close proximity to the proposed development site consists mainly of agricultural fields, infrastructure (roads, powerlines, etc.) as well as other developments (businesses, filling stations, restaurants, lodges, holiday resorts, etc.). Refer to the map in Appendix A(4a)- Biosphere-Buffer Zone that illustrates surrounding landuse in the buffer zone.

The drainage line that runs through the middle of the site along roughly two thirds of the length of the site will be conserved as a green area where no development may take place. Furthermore, very strict landscaping stipulations will be included in the Environmental Management Plan. These principles will include, but not be limited, to the following:

- *Where new vegetation is introduced to the site, an ecological approach to rehabilitation and vegetative screening measures, as opposed to a horticultural approach to*

landscaping should be adopted. For example, communities of indigenous plants enhance biodiversity and blend well with existing Magaliesberg vegetation. This approach can significantly reduce long term costs as less maintenance would be required over conventional landscaping methods as well as the introduced landscape being more sustainable.

- *All new landscaping must be done with a strong “indigenous only” approach. This implicates the removal of all current exotic plant biota and replacement with indigenous species. This could be physical or chemical treatment of the exotic individuals. No indiscriminate spraying would be allowed as this could kill indigenous species.*
- *All large indigenous tree species should be conserved wherever possible and incorporated into the design of the project.*
- *Landscaping should be environmentally sensitive and should meet the following requirements:*
 - *Limited irrigation through water-wise gardening (use local plants adapted to local conditions).*
 - *Strict fertiliser, pesticide and herbicide control must be applied.*
 - *Reduction of weeds and erosion control by minimum tillage gardening practices (groundcovers and mulching).*
- *Re-vegetation and rehabilitation measures should be identified for implementation to rehabilitate areas that became degraded due to construction activities.*
- *Significant considerations in terms of a ‘green’ architectural approach will be considered. These requirements are listed in Chapter 2, Paragraph 2.5 of this document and will be included in the Environmental Management Plan that will form part of the conditions for Environmental Authorisation, if issued.*
- *It should also be realised that easily accessible vacant land relatively close to work opportunities (as is the case with this property) is always under risk for settlement of squatters with associated negative social impact (i.e. increased crime and safety risk) and degradation of the environment in the absence of sufficient engineering services (water supply, sewage and waste disposal), i.e. collection of firewood, use of the watercourse for ablution activities, placement of snares, etc.*

To summarise, the opinion is offered that the NW Gateway Project as proposed will not impact negatively on the Magaliesberg Biosphere Reserve because of the following:

- *The township components are to a large extent an extension of existing land use and or are compatible with other development within the macro area. The proposed facilities in terms of healthcare will provide an essential service to the area.*
- *Environmental sensitivities of the site had been identified and the ecological sensitivity map provided by the ecologist subsequently guided the layout of the township.*
- *A relatively large portion of the site (approximately 18%) had been set aside as a Private Open Space to be upgraded and maintained. This area involves the water course with a significant buffer zone. It is at present degraded to some extent because of illegal*

dumping, encroachment of alien invasive plant species, etc.

- *The total site is ±30 hectares. The total built area (footprint of hard surfaces) is estimated to be ±10 hectares, which equates to a built area of only 33% of the total site. It is therefore estimated that approximately 67% of the total site will be either natural open space or landscaped indigenous gardens.*
- *A strong “indigenous only” approach will be followed with landscaping and as many as possible existing indigenous vegetation will be incorporated into the development.*
- *A green architectural approach is also proposed (in terms of water saving, electricity saving, restriction of light pollution, etc.)*
- *The proposed North West Gateway Project is planned in a legal, pro-active and structured manner taking all development components, environmental features, site potential and restrictions into account.*

5.3.3 Comment Received on the Draft Scoping Report

South Africa Heritage Resource Agency (SAHRA): Ms Natasha Higgitt

SAHRA requested the following:

1. A Visual Impact Assessment
2. A Traffic Assessment on the historical Hartebeespoort dam wall
3. A Palaeontology Impact Assessment
4. The revised HIA must also note that once the vegetation is cleared, the number of graves must be verified by a qualified archaeologist.
5. A revised HIA that must assess the historical canals located on the north-east border of the proposed development.
6. All appendices and the final Scoping Report must be submitted along with the draft EIA and appendices at the start of the Public Review Period.
7. Comments from the North West PHRA must be obtained regarding sites 1, 3-8 (and the historical canals and dam wall) as these are protected under section 34 of the NHRA and do not fall within SAHRAs jurisdiction

Response from Landscape Dynamics

1. *A Visual Impact Assessment specialist was appointed and the VIA is included in Chapter C of this EIA Report.*
2. *Engineers were appointed to conduct a Traffic Assessment and the TA is included in Chapter C of this EIA Report.*
3. *A palaeontologist was appointed and the and the PIA is included in Chapter C of this EIA Report.*
4. *It is noted in the revised HIA that once the vegetation is cleared, the number of graves must be verified by a qualified archaeologist.*
5. *The HIA was amended and reads as follows:*

The aquaduct is merely an earth furrow dug from the river and running through the site. Due to it being totally overgrown it was impossible to take a photograph, but it is indicated on the 1:50 000 topographic map. It has no specific heritage characteristics apart from being associated with the Hartebeestpoort Dam water scheme.

The heritage feature (aquaduct) is regarded as having a field rating of Local Grade IIIB. It should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. In this particular case it could be used as part of the stormwater management plan of the township.

6. *All appendices as requested will be uploaded onto SAHRIS together with the Draft EIA Report.*
7. *Comments from the North West PHRA was received and the following was stated:
An application form has to be completed and proof of payment need to be provided for structures older than 60 years e.g sites 1,3,4,8 and others including the historical canals and dam wall as these are protected under section 34 of the NHRA.
Please note that these requirements are included in the Environmental Management Plan.*

North West PHRA: The Coordinator: Mr Motlhabane Mosiane

An application form has to be completed and proof of payment need to be provided for structures older than 60 years e.g sites 1,3,4,8 and others including the historical canals and dam wall as these are protected under section 34 of the NHRA.

Response from Landscape Dynamics

- *These requirements are included in the Environmental Management Plan.*

Chairman Hartbeespoort Tourism Association: Mr Iain Gunn

The proposed development is wonderful news and he sincerely hope that the development will go ahead. They should be contacted should Landscape Dynamics require any support or information from the Tourism Association.

Response from Landscape Dynamics

- *Comment noted*

The South African National Roads Agency (SOC) Limited: Secretary Typist: Ms Ria Barkhuizen

She stated that a response will be provided within 30 days, in line with requirements of Section 29 of the Spatial Planning and Land Use management Act (Act No.16 of 2013) read with Section 3 of the Promotion of Administrative Justice Act (Act No.3 of 2000).

Response from Landscape Dynamics

- *No further comment was received.*

Altydmooi Boerdery: Mr Jan Nel

He requested to be registered as an Interested and Affected Party.

Response from Landscape Dynamics

- *Mr Nel was added to the IAP Register*

5.3.4 Comment Received on the Final Scoping Report

NW READ: Environmental Quality Management: Ms Queen Imasiku

Due to the sensitive nature of the site, it is required that input from the Department's Biodiversity Management Section be obtained. The Final Scoping Report was referred to the Biodiversity Management Section for their input/comments.

Response from Landscape Dynamics

A site visit with Mr Bobby Masuku and three other staff members from the Biodiversity Section was undertaken on 20 November 2018. Confirmation of the key issues that was raised during the site visit was sent via email to Mr Masuku and no further comment was received.

Key issues raised during the site visit:

- *It was requested that the previous Record of Decision issued in 2005 be provided. The relevant documentation was emailed to Mr Masuku.*
- *The latest layout dated November 2018 was communicated with and also emailed to Mr Masuku.*
- *The key findings of a WULA Pre-Application Meeting held with the Department of Water and Sanitation were communicated with Mr Masuku. They confirmed that the historic manmade canal which collects storm water from the mountain underneath the road could be maintained and upgraded as per engineering requirement. They support the layout in terms of protection of the natural watercourse area (riparian zone plus a 15m buffer). Water use authorisation is required, but General Authorisation is applicable (for the crossing of the watercourse and the discharge of treated effluent from the proposed sewage treatment works).*
- *A concern was raised that the township would result in significant additional storm water due to increased hard surfaces. It was confirmed that Civilconsult Consulting Engineers had been appointed for the flood line delineation - the 1:100 year line is indicated in a blue line on the layout plan. This area is way smaller than the area provided for protection along the watercourse as prescribed by the ecologist to ensure that the biodiversity of the site is maintained; therefore there is more than ample allowance for increased run-off.*
- *It was noted that the site is located at the foothills of the Magaliesberg and within the buffer of the Magaliesberg Biosphere.*
- *It was also noted that the site is isolated from nearby natural land (and the mountain) due to the site being bordered on both sides by the Road R104 and the R513 respectively; the*

residential village of the Department of Water and sanitation to the east, and the northern boundary of the site consists of the property of the Amanzi Shareblock (Pty) Ltd – a private recreational resort.

- *Cognisance is taken of the fact that no Red Data vegetation species occur on the entire development site, but that numerous *Sclercarya birrea* (marula) trees occur, which require that a permit be obtained from the Department of Forestry and Fisheries for the removal, cutting and trimming of all these trees.*
- *Mr Masuku was informed that the ecologist for the project, Dr Leslie Brown from Enviroguard Ecological Services support the current layout.*
- *Mr Masuku will provide requirement for inclusion in the Environmental Management Plan which will probably include the following (please note that no further comment from Mr Masuku was received, but specifications below have been included in the EMP):*

Specifications prior to construction

- *The ecologist must visit the site prior to commencement of any construction activities and he must mark all trees and clumps of trees that should be maintained, specifically in the *Vachellia torilis-berchemi zyeheri* woodland and the *Combretum apiculatum-Senegaia caffra* woodland which occurs north of the delineated riparian zone.*
- *All marula trees occurring on the entire project area must be identified and clearly marked and documented so that a permit application could effectively be made for the trees which would be in the direct line of the construction activities.*
- *All prospective buyers must be made aware of the restriction on removal of the specific tree species and clumps of trees on their stands.*
- *The landscaping/master plan of the township must reflect the following :-*
 - *Only indigenous vegetation occurring in the macro area must be allowed*
 - *The clumps of trees to be maintained in the township should preferably be included in Private Open Space areas amongst residential erven.*
- *The engineers must provide a storm water management plan prior to commencement of construction to the satisfaction of the Department of Water & Sanitation. Specific issues to be addressed must include energy dissipating methods where the canal will release water into the natural watercourse area and any other areas where storm water could possibly result in erosion.*

NW READ: Environmental Quality Management: Ms Queen Imasiku

- The Department accepted the Final Scoping Report and Plan of Study as submitted. The following are however recommended for inclusion in the EIR:
 - i. Indigenous trees must be clearly mapped and retained as such and only indigenous vegetation appearing in the macro area will be allowed within the development.
 - ii. The clumps of trees to be maintained in the township should preferably be included in the Private Open Space erven amongst residential erven.
 - iii. The Draft EIR must be distributed to all IAPs for their comment and included in the Final EIR.
 - iv. An EMPr must be compiled according to GN Nr 326.

Response from Landscape Dynamics

- i. *This is stipulated as such in the EMP.*
- ii. *The EMP states the following:*
 - a. *The ecologist must visit the site prior to commencement of any construction activities and he must mark all trees and clumps of trees that should be maintained, specifically in the Vachellia torilis-berchemi zyeheri woodland and the Combretum apiculatum-Senegaia caffra woodland which occurs north of the delineated riparian zone.*
 - b. *All marula trees occurring on the entire project area must be identified and clearly marked and documented so that a permit application could effectively be made for the trees which would be in the direct line of the construction activities.*
- iii. *The Draft EIR (this document) has been distributed to all IAPs for their comment.*
- iv. *The EMP is attached under Appendix F.*

North West PHRA: The Coordinator: Mr Motlhabane Mosiane

An application form has to be completed and proof of payment need to be provided for structures older than 60 years e.g sites 1,3,4,8 and others including the historical canals and dam wall as these are protected under section 34 of the NHRA.

Response from Landscape Dynamics

- *These requirements are included in the Environmental Management Plan.*

5.3.5 Conclusion of Public Participation during the Scoping Phase

Even though the project was advertised widely as described above, relative few comments had been received during the initial advertising of the project as well as on the Draft Scoping Report. All communication received up to this stage was documented and addressed in the Final Scoping Report which was submitted to NW READ for approval. The Final Scoping Report and Plan of Study for the EIA were approved by the Department.

5.4 Issues raised during the EIR Phase

NW READ: Environmental Quality Management: Ms Queen Imasiku

The following comment on the Draft Scoping Report was received after the Report was submitted to NW READ for approval and is therefore addressed below.

The Final SR and Plan of Study must ensure that the following issues area addressed:

- a) The layout plan must show all sensitive environmental features to be affected by the development and clearly indicate that stands/erfs where each development will be located.

- b) A geo-technical study is required. The possibilities of the proposed development to contaminate underground water must be investigated including the level of reliance of surrounding properties on ground water and the ground water reference in terms of quality.
- c) Access roads must comply with standards of specifications of SANRAL.
- d) Sewage disposal methods must be investigated.
- e) Detailed information regarding the management of solid waste during construction and operational phases must be provided. If this is to be supplied by the municipality, a signed agreement must be included in the final EIA Report.
- f) Consultation with DWS regarding the drainage channel must be provided.
- g) Consultation with the Bojanala District Municipality and Department Health for the hospital must be undertaken and information regarding hazardous waste management must be provided.

Response from Landscape Dynamics

- a) *The final layout plan as attached under Appendix B clearly shows the development components in relation to the environmental sensitive drainage line plus its buffer area (no development zone) as well as the erf that has been demarcated for the protection of the existing graves.*
- b) *A geo-technical study was conducted and summarised in Chapter 4 of this report and attached under Appendix C. A Phase 2 Assessment is recommended to determine the geological zones where the site will be divided into development zones by grouping together all the land facets with the same geotechnical characteristics. This will determine the foundation requirements for the different types of development structures. The undertaking of this study is stipulated in the EMP and must be conducted before construction commences – the results of this study will not impact on the outcome of the EIA and will be done during the final design stages of the project and after the issuing of the EA.*

The proposed development does not involve any activities that could result in significant groundwater pollution or are related to storage and/or disposal of hazardous waste on site. The medical waste that will be derived from the hospital facilities will not be stored or incinerated on site. It will be removed on a regular basis from the hospital by an appropriately licensed company who will dispose of it according to relevant legal requirement.

The biggest potential for groundwater pollution could be associated with the sewage works; however, stringent methods will apply in the design, construction and operation of the proposed facility. The Department of Water and Sanitation will not grant water use authorisation in the absence of sufficient proof that the groundwater will not be negatively impacted upon. The concept designs of the recommended closed Biological Waste Water

Treatment Works and mitigatory measures are included in Appendix D, and the final design with construction and operational specifications will be available during the design phase if the development and will be communicated with the DWS. The requirements of the water use license must be followed at all times and it is stipulated as such in the EMP which will form part of the conditions for approval of the township.

No groundwater will be withdrawn for the purpose of the township. A municipal connection is available. The groundwater levels will not be affected and the adjacent landowners will therefore also not be affected by the township.

- c) The requirements as per SANRAL and the NW Department of Roads were all taken into account by the consulting engineers when access roads, etc. were planned. Input during the public participation process from these departments was also taken into consideration and access roads were adjusted according to their stipulations.*
- d) No formal municipal infrastructure exists in the immediate vicinity of the Proposed Development. Sewage will gravitate to Erf 37 where a proposed Sewage Treatment Facility (STF) will be constructed – also refer to Chapter 2 / Appendix D of this report for the Engineering Services Availability Report. Refer to Appendix D for a brochure on the proposed Biological Waste Water Treatment Plant (it is a closed system).*
- e) Waste management stipulations are included in the EMP. A Services Agreement will be signed between the Applicant and the Municipality once the final designs are available. No written agreement can be supplied at this stage; therefore this requirement is included as a condition to fulfil during the Design & Pre-Construction Phase prior to commencement of construction.*
- f) A Water Use License Application was made to DWS and all required information was submitted to the Department in January 2019. Please refer to Appendix E(6) for a copy of the minutes of the Pre-Application meeting and proof of submission of the WULA.*
- g) Application for a Private Hospital (142 bed facility) was made to the NW Department of Health and approval was granted by the Provincial Private facility Adjudication Committee on 21 November 2018 (attached in Appendix F). Conditions as stipulated in this approval are included in the Environmental Management Plan and are attached under Appendix F.*

Note that the hazardous waste applicable to the township is medical waste. The EMP states clearly that no medical waste can be stored or disposed of or incinerated on site. The requirement for an agreement for removal by the relevant authority / institution of the medical waste is a condition to fulfil during the Design & pre-Construction Phase.

Department of Water & Sanitation: Acting Director: Northern Operations: (Area Manager: Hartbeespoort): Mr Hannes Pretorius

An access road that is normally utilised by DWS for heavy or extra heavy motor vehicles has been included in the layout. This road was in use since the building of the Hartbeespoort Dam (since 1918). All Construction Equipment utilised to perform work at the dam and outlet structure makes use of this particular road. Furthermore, the private property of Bester must use the same access road, not through the Departmental premises. A meeting with Landscape Dynamics was requested.

Response from Landscape Dynamics

A meeting was held on 20 November 2018 and the key issues that were discussed are as follows:

- *Landscape Dynamics explained to Mr Pretorius that the layout proposal does allow for access to a specific point after which they should provide their own access through Portion 221 of the Farm Hartebeesfontein 445-JQ*
- *Mr Pretorius explained the following :*
 - *Portion 221 does not belong to the Department, it is registered in the name of the C & M Bester Familie Trust.*
 - *The road has been used by the Department since 1918 when construction on the Hartebeespoort Dam commenced.*
 - *Since that time, the road had been used continuously up to the present date.*
 - *The use of a road for a period of 30 years or more constitutes a prescriptive right in terms of South African law. ("A prescriptive easement is an easement upon another's real property acquired by continued use without permission of the owner for a legally defined period. State law, which varies by state, defines the time period required to acquire a prescriptive easement.")*
 - *The road is required for use by large trucks for maintenance purposes of the dam wall and outlet structures, specifically the large radial gates.*
 - *There is another access road just below the dam wall which is way too steep for heavy vehicles.*
 - *The trucks cannot get through the relatively small gate structures at the residential village of the Department.*
- *Mr Pretorius requested allowance for continuous use of the existing access road by the Department. A width of 4metres is required for a length of approximately 440m (taking cognisance of the fact that the first portion of the road will be upgraded and serve a public road as per requirement from the provincial roads department). It is proposed that they will secure access to this road with a locked gate and the road will necessarily be maintained by themselves.*

Landscape Dynamics conferred with the Applicant and the following decisions were communicated to Mr Hannes Pretorius (no further comment in this regard was received):

- *The township layout will be amended to include the DWS access road as requested.*
- *A width of 4 meters will be made available on the project site.*

- *The boundary wall of the project site will be constructed on the western side of this road.*
- *The road will be controlled with a locked gate by DWS who will also be responsible for the maintenance on the road.*

Department of Water & Sanitation: WULA Pre-Application Meeting

Refer to the minutes and attendance register included in Appendix E(6). The objectives of the meeting were to

- To communicate the project with the Department of Water and Sanitation
- To communicate the extent and characteristics of the watercourse
- To communicate the extent of the Wastewater Treatment Works
- To confirm the relevant listed activities that require authorization
- To confirm whether General Authorisation or a full Water Use License Application is applicable
- To confirm the extent of engineering and specialist input required in the way forward

The following was concluded:

Legal requirement (General Authorisation or WULA)

It was confirmed that the planned capacity for the sewage works is calculated at approximately 540m³ per day which is way below the 2 000 cubic metres per day threshold; therefore General Authorisation is applicable to this township.

It was confirmed that the township will trigger the following activities

- Section 21 (c) & (i) - for the purpose of the bridge crossings with engineering services, as well as the construction of the channel/culvert as well as the construction of the Waste Water Treatment Facility within 100m from the watercourse.
- *“impeding or diverting the flow of water in a watercourse” and “altering the bed, banks, course or characteristics of a watercourse”*
 - Section 21 (f) – for the release of treated effluent into the natural watercourse *“discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.”*
 - Section 21 (g) – for the establishment of sludge drying beds
- *“disposing of waste in a manner which may detrimentally impact on a water resource”*

Engineering Design and Specialist input required

- Bridge crossings
 - Number and positions of all bridge crossings to be confirmed (GPS Points- start, center and middle)
 - Concept layout to be supplied

- Construction method statement to be supplied
- Service infrastructure in regulated area
 - Concept design of structures (Specifications width, materials, etc.)
 - Method statement of placement of engineering services in the regulated area
- Waste Water Treatment Facility
 - Concept layout (including sludge drying beds)
 - Treatment description
 - Confirmation of Special Standard
 - Operational guidelines

Specialist input required

Mr Kutama confirmed that, because it would be an application for General Authorisation, it would not be required to compile an Integrated Water & Waste Management Plan.

Township Layout

Mr Kutama requested that the following amendments be made to the layout:

- The riparian area with buffer zone as provided by the ecologist must be indicated on the layout as “Natural Watercourse and Riparian Area”
- Because the stormwater channel was historically described as an “aqueduct”, the Department would allow that this portion of the watercourse between the “Natural Watercourse and Riparian Area” and the road be canalised.
- The canalised / culvert must be indicated on the layout plan as a “Channelled Watercourse”.
- No houses or structures apart from the bridge and engineering services structures may be placed within the “Natural Watercourse and Riparian Area”.

Input requested from Mr Kutama

- Mr Kutama will confirm the extent and requirement for a Water Quality Assessment Report for the purpose of the Waste Water Treatment Facility.
- He will provide the DW 755 form which has to be filled out after the Pre-Application Meeting (as per the latest DWS requirement). (Mr Kutama later confirmed that this form should be available on the E-WULA system).

Response from Landscape Dynamics

- *The township layout included in Appendix B(3) reflects the decision on the canalised water course and the requirement in terms of the legend and reference to specific components are also met. The conditions in terms of design and engineering input form part of the Water Use License Application which is undertaken separately from the Application for Environmental Authorisation.*

5.4.1 Comment received on the Draft EIR

Southern and East Africa regional chair, Commission on Ecosystem Management: IUCN Senior Manager: Habitats | Endangered Wildlife Trust: Dr Ian Little

While this site, according to the documents provided, does not seem to have any significant threatened or endemic species of conservation concern it still does have a fairly large direct and long-lasting (in perpetuity) footprint on what is intact habitat (it does not need to be pristine to still be considered intact and supporting complex ecosystem functions).

Based on the documents Mr Little do not have any immediate concerns with the EIR or EMP but did note that there is no mention of any offsets, should the development go ahead. Given the permanent nature of the impact and the size and state of the site being impacted there should be some compensation in the form of an offset with a net gain.

Response from Landscape Dynamics

In terms of the suggested biodiversity offset, Landscape Dynamics commented as follows:

- *In general, biodiversity offsets are considered as a last resort if the impact of a development cannot be avoided or minimised to a low significance.*
- *In the case of the NW Gateway development the following was confirmed (as per the Botanical Impact Assessment):*

The proposed township is situated within the demarcated buffer zone of the Magaliesberg Biosphere Reserve (outside the core and transitional areas of the biosphere). The most important ecosystem in this area is the Magaliesberg mountain. It is however not expected that the township as proposed will impact negatively on the Magaliesberg Biosphere Reserve because of the following:

- *This project site is not situated on the mountain, but on the plains north of the mountain.*
- *The project area is largely isolated due to surrounding developments and it is separated from the mountain via a provincial road.*
- *The township components are to a large extent an extension of existing land use and or are compatible with other development within the macro area.*
- *The total site is ±30 hectares. The total built area (footprint of hard surfaces) is estimated to be ±10 hectares, which equates to a built area of only 30% of the total site. It is therefore estimated that approximately 70% of the total site will be either natural open space or landscaped indigenous gardens. This area includes the water course and sensitive riparian and plant communities with a significant buffer zone.*

Due to the above, Landscape Dynamics is confident that an offset for this project is not needed since the impact on the biodiversity of the site will be managed to low and acceptable levels.

Adjacent landowner: Farm Altyd Mooi 574-JQ; Altyd Mooi 575-JQ and Portion 131 of the Farm Hartebeesfontein 445 JQ: Mr Jan Nel Snr en Mr Jan Nel Jnr

They have no objection to proposed development as indicated in the latest Site Plan dated February 2019. They do however wish to register a concern regarding the proposed road access, in particular the affected road P251-1. And in particular Road Access No3 on the NW Gateway Site Plan. Their concerns are the following:

1. The traffic impact study of January 2019 conducted by Civil Consult does not mention the road servitude opposite the proposed Access 3 (Appendix D5) (See attached drawing area JK)
2. As the property owners of Altyd Mooi 574-JQ; Altyd Mooi 575-JQ and Portion 131 of the Farm Hartebeesfontein 445 JQ we have a similar planned development that was proposed but never formalised. As indicated in the attached drawing as well as correspondence from the Department of Public Road Works and Transport we have an upgraded road access plan to our property in draft form. Our request and concern is that this design be incorporated with NW Gateway site layout and access plan in such a manner that will be acceptable to our proposed development as well as the Department of Public Road Works and Transport.

Response from Landscape Dynamics

We communicated extensively with all the role players and can assure you your request was considered thoroughly. Unfortunately we cannot amend Access 3 to the township at this stage, because of the following:-

- *The access to the township is the result of communication between the civil engineers for the project (Civilconsult Consulting Engineers) and Mr Johan van Wyk from the NWPG Transport & Roads Department. All four accesses to the township are planned as per their requirement.*
- *The township application has been submitted to the Madibeng Local Municipality – 5 copies had been delivered to the municipality and 20 copies to external departments during December 2018. To change this access now would result in significant cost and delay. All the erven would have to be renumbered and the memorandum and draft conditions of establishment would have to be amended.*
- *The hospital permit obtained in November 2018 is only valid for a period of 18 months in which construction must be completed. If this lapses, the application for the hospital permit has to be restarted from the beginning.*
- *Access 3 as proposed in the layout submitted in January 2019 for comment is at the same place as Access 3 provided in the layout of the Draft Scoping Report distributed also to you for comment on 25 July 2018. On 2 August you confirmed your e-mail addresses to be registered. We did not receive any response and/or comment from you regarding the Draft Scoping Report and/or layout at that time. We therefore did not request consideration of amendment of the accesses by the town planners, architects and engineers.*

We confirmed with the Applicant that you could liaise with him to amend the Access 3 once the township application as proposed at the moment has been approved. .

North West Provincial Department of Public Works and Roads (Dpwr) - Chief Directorate Transport Infrastructure: Mr KA Sitase

Please provide the electronic documentation to Mr Johan Van Wyk in our Bojanala District in Rustenburg for him to process the comments on behalf of the Dpwr.

Response from Landscape Dynamics

The requested information was forwarded and Landscape Dynamics stated that the information was also forwarded to their Department on 20 February 2019 to the North West Department of Public Works and Roads, The Chief Director: Infrastructure for attention: Mr M Sediti and the The Chief Director: Roads and Management, for attention: Mr C Molefe.

No further comment was received.

Provincial Department of Public Works and Roads: Directorate Strategic Asset Management: Admin Officer: Land Administration: Ms Lesego Phefo

They do not have comments or objection as the property is privately owned, however the property development is near the roads so the matter has been referred to the Roads Directorate.

Department of Water & Sanitation: Water Quality Office, Hartebeespoort: Ms Cornia Theunissen

They requested that a hard copy of the EIR be sent to their offices.

Response from Landscape Dynamics

A hard and electronic copy of the EIR was couriered to their offices but no further comment was received.

Please note that the WULA is still underway and that Landscape Dynamics has regular contact with the eWULA section in order to finalise the application.

Magaliesberg Biosphere Reserve: The Chairman, Mr Andrew Murray

The requested link to Appendixes A and B was forwarded to Mr Murray. No further comment was received.

5.5 Conclusion of Public Participation Programme

The Consultants are confident that all reasonable actions were undertaken to ensure that stakeholders were informed of the study and placed their initial concerns and comments on record. Issues raised during the PPP are addressed in this chapter in what is believed to be a fair and satisfactory manner. Relevant mitigatory measures and specifications are prescribed in the Environmental Management Plan attached under in Appendix F.

CHAPTER 6: IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

6.1 *Methods Used to Identify Impact*

Environmental issues and impacts have been identified through the following means:

- Evaluation of the facility in terms of process, layout and operation methodology.
- Consultation with the Project Team;
- Findings and recommendations of the environmental specialists
- Evaluation and consideration of relevant existing environmental data and information;
- The general knowledge and extensive experience of the Environmental Consultants in the field of Environmental Impact Assessments for township establishment;
- Correspondence with Interested and Affected Parties, including directly affected landowners, general stakeholders and relevant authorities.

6.2 *List of Impacts Associated with the Development*

6.2.1 *Expected Negative Impacts*

The main potential negative impacts associated with the project are the following:

Planning Phase (critical issues that must be addressed in design and planning phase):

- Impact on the watercourse and natural habit (fauna & flora)
- Impact on the Magaliesberg Biosphere Reserve
- Impact on groundwater
- Increased run-off resulting in erosion and a loss of soil
- Impact on cultural-heritage and paleontological environment
- Visual impact
- Increase in traffic

Construction Phase

- Impact on the watercourse and natural habit (fauna & flora)
- Increased risk for groundwater pollution
- Increased risk for erosion resulting from construction activities
- Influx of labourers with associated crime, access control, risk for habitat destruction
- Health & safety risk during construction
- Impacts associated with construction activities such as noise and dust
- Impact on cultural-heritage environment

During Operational Phase

- Continuous risk to the watercourse and natural habit (fauna & flora)
- Continuous risk for ground and surface water pollution
- Increased risk for impact on surrounding environment (i.e. habitat destruction and veld fires)
- Increased run-off resulting in erosion
- Increased traffic
- Increased pressure on municipal infrastructure

6.2.2 Expected Positive Impacts

The positive impacts of the proposed project on the environment are as follows:

- A safe residential environment will be created.
- Unutilised land will be developed to its full potential.
- This application will provide additional job opportunities and areas of employment.
- The application promotes the optimum use of land.
- The application will contribute to the promotion of a diverse combination of land uses that enables a greater intensity of mixed-use development in line with the planning principles.
- The application will provide residential opportunities close to working opportunities in the macro area (tourism, mining and agriculture).
- It should also be realised that easily accessible vacant land relatively close to work opportunities (as is the case with this property) is always under risk for settlement of squatters with associated negative social impact (i.e. increased crime and safety risk) and degradation of the environment in the absence of sufficient engineering services (water supply, sewage and waste disposal), i.e. collection of firewood, use of the watercourse for ablution activities, placement of snares, etc.

The proposed North West Gateway Project is planned in a legal, pro-active and structured manner taking all development components, environmental features, site potential and restrictions into account.

6.3 Proposed management of impacts and mitigation

6.3.1 Environmental Impact Assessment Tables

The Environmental Impact Assessment Tables includes a description of expected impact on the different environmental components; as well as proposed mitigation measures. These mitigation measures are also included in the Environmental Management Plan and the tables are also attached as an Appendix to the EMP.

Impacts were also evaluated and assessed in terms of the following criteria:

Extent of impact	Explanation of extent
Site	<i>Impacts limited to construction site and direct surrounding area</i>
Local	<i>Impacts affecting environmental elements within the local area / district</i>
Regional	<i>Impacts affecting environmental elements within the province</i>
National	<i>Impacts affecting environmental elements on a national level</i>
Global	<i>Impacts affecting environmental elements on a global level</i>
Duration of impact	Explanation of duration
Short term	<i>0 - 5 years. The impact is reversible in less than 5 years.</i>
Medium term	<i>5 - 15 years. The impact is reversible in less than 15 years.</i>
Long term	<i>>15 years, but where the impacts will cease if the project is decommissioned</i>
Permanent	<i>The impact will continue indefinitely and is irreversible.</i>
Probability of impact	Explanation of Probability
Unlikely	<i>The chance of the impact occurring is extremely low</i>
Possible	<i>The impact may occur</i>
Probable	<i>The impact will very likely occur</i>
Definite	<i>Impact will certainly occur</i>
Magnitude/Intensity of impact	Explanation of Magnitude/Intensity
Low	<i>Where the impact affects the environment in such a way that natural, social and cultural functions and processes are not affected</i>
Moderate	<i>Where the affected environment is altered, but natural, social and cultural functions and processes continue albeit in a modified way</i>
Severe	<i>Where natural, social and cultural functions or processes are altered to the extent that it will temporarily or permanently cease</i>
Significance of impact	Explanation of Significance
None	<i>There is no impact at all</i>
Low	<i>Impact is negligible or is of a low order and is likely to have little real effect</i>
Moderate	<i>Impact is real but not substantial</i>
High	<i>Impact is substantial</i>
Very high	<i>Impact is very high and can therefore influence the viability of the project</i>

DESIGN AND PRE-CONSTRUCTION PHASE
Critical issues to be addressed during the design and planning phases

Impact on the watercourse and natural habitat (fauna & flora)

Impact

- A watercourse transects the development site from south-west to north-east, draining towards the Crocodile River east of the township and downstream of the Hartbeespoort Dam. Watercourses are protected in terms of the National Water Act, 1998 (Act Nr 36 of 1998).
- It is important that watercourse systems are properly managed and protected to prevent ecosystem degradation. At this stage the watercourse is not protected at all.
- Impact on the watercourse is associated with an impedance/diversion of flow; direct

modification or loss of aquatic habitat; water quality impact and erosion resulting from little or no stormwater management.

- Impact on Fauna & Flora is mostly associated with the disturbance to and/or destruction of habitat with associated loss of plant species; loss of rare/medicinal species ; Loss of animal species; loss of biodiversity; increased soil erosion; and alien plant invasion
- In this case, the natural habitat is at present affected by numerous factors, mostly resulting from the activities of people. "On-site" factors which affect the natural habitat and watercourse include the following:-
 - Veld fires
 - Using the watercourse for ablution
 - Squatters
 - Illegal dumping
 - Cutting of trees for firewood
 - Placement of snares
 - Informal businesses
 - Footpaths
- Urban development is characterised by large areas of sealed surfaces which results in natural infiltration being considerably reduced with the associated increase in surface run-off which will end up in the watercourse if not management effectively.
- Run-off from landscaped areas (during the operational phase of the township) could include herbicide. Pollutants such as heavy metals, oils and hydrocarbons from the filling station could also end up in the watercourse system.
- The uncontrolled cutting of trees that takes place at present in the study area is a significant impact. In terms of Section 15(1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Trees are protected for a variety of reasons, and some species require strict protection while others require control over harvesting and utilization.

Mitigation

- The watercourse with an area of high flora species diversity with a buffer zone of 15 meters as identified by Dr Leslie Brown from Enviroguard Ecological Services should offer sufficient protection for the freshwater and riparian system if implemented in the township layout. This area has to be excluded from the development area.
- No activity may take place within this area in the absence of water use authorisation for the specific activity, necessary to obtain prior to construction. A Water Use License Application (WULA) was made as per the requirement confirmed with the Department of Water and Sanitation during the WULA Pre-Application meeting.
- The ecologist must visit the site prior to commencement of any construction activities and he must mark all trees and clumps of trees that should be maintained, specifically in the *Vachellia*

torilis-berchemi zyeheri woodland and the *Combretum apicultatum-Senegaia caffra* woodland which occurs north of the delineated riparian zone.

- All *Sclerocarya birrea* (marula) trees occurring on the entire project area must be identified and clearly marked and documented so that a permit application could effectively be made for the trees which would be in the direct line of the construction activities. The Department of Agriculture, Forestry and Fisheries (DAFF) must be approached for the required permits.
- A proper **Stormwater Management Plan** must be compiled by a qualified civil engineer prior to commencement of construction to the satisfaction of the Madibeng Local Municipality with the main objectives to prevent negative impact resulting from the township on the watercourse system; and to ensure energy dissipating methods are in place where the canal will release water into the natural watercourse area and any other areas where storm water could possibly result in erosion. Refer to the item below '*Increased run-off resulting in erosion and a loss of soil*' for additional requirement for the Stormwater Management Plan.
- Cognisance must be taken of the following :-
 - Stormwater run-off from the mountain south of the site is channelled underneath the road into a hand-dug stormwater channel which was built many years ago to accumulate the run-off into the natural water course on the site. It must be maintained and upgraded as a concrete channel/culvert as part of the stormwater management for the site. The engineers require that a 3,0m wide servitude be registered for this purpose. The length is calculated at approximately 275m before the water would be released into the natural open watercourse. The proposed township layout reflects the correct position and width of the servitude required. Energy dissipating measures must be implemented to prevent erosion at this outlet.
- A **Landscape Rehabilitation and Plant Plan** must be compiled for construction site rehabilitation and landscaping of communal areas in the township. It must be implemented during the construction phase while all equipment and personnel are available on site.

It should include the following:

- Slope shaping and stabilising methods
- Mixed grass mixture (indigenous species from the area, inclusive of both quick-growing annual creepers and tough perennials)
- Vegetation should be introduced to areas cleared of vegetation as soon as possible to prevent erosion by reducing the speed of run-off and to have a filtering effect of stormwater.
- The timing of clearing activities is of vital importance. Clearing activities and earth scraping should preferably be restricted to the dry season to prevent erosion and siltation. The dry months are the period when most species are either dormant or finished with their breeding activities.
- Environmentally sensitive practice requirements for stockpiling of topsoil, including sufficient distance from watercourse, etc. must be provided.
- Only indigenous vegetation occurring in the macro area should be introduced to the site.
- A plant plan should be provided for the communal areas.

- The clumps of trees to be maintained in the township should preferably be included in Private Open Space areas amongst residential erven.
- Ecological management measures must be identified for the Private Open Spaces in the township to be actively managed and overseen by the owners of the proposed development.
- All prospective buyers must be made aware of the restriction on removal of the specific tree species and clumps of trees on their stands.
- Only indigenous vegetation occurring in the macro area should be introduced to the site.
- List of indigenous plants and shrubs with basic planting methods to present to new property owners to promote water-saving principles and natural landscaping.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on the watercourse	Local	Long term	Definite	Moderate	Moderate	Low
Impact on the fauna & flora	Site	Medium term	Definite	Moderate	Moderate	Low

Impact on the Magaliesberg Biosphere Reserve

Impact

- The development is situated within the demarcated buffer zone of the Magaliesberg Biosphere Reserve (outside the core and transitional areas of the biosphere). The most important ecosystem in the area is the Magaliesberg mountain.
- It is not expected that the Northwest Gateway Project as proposed will impact negatively on the Magaliesberg Biosphere Reserve because of the following:
 - This project site is not situated on the mountain, but on the plains north of the mountain.
 - The project area is largely isolated due to surrounding developments. The township is separated from the mountain via a provincial road.
 - The township components are to a large extent an extension of existing land use and or are compatible with other development within the macro area. The proposed facilities in terms of healthcare will provide an essential service area.
 - Environmental sensitivities of the site had been identified and the ecological sensitivity map provided by the ecologist subsequently guided the layout of the township.
 - A relatively large portion of the site had been set aside as a Private Open Space to be upgraded and maintained. This area involves the water course and sensitive riparian communities with a significant buffer zone. It is at present degraded to some extent because of illegal dumping, encroachment of alien invasive plant species, etc.

- The total site is ±30 hectares. It is estimated that approximately 70% of the total site will eventually be either natural open space or landscaped indigenous gardens.

Mitigation

- The watercourse with the 15m buffer zone as identified by the ecologist is reflected in the township layout.
- It is recommended that the sensitive areas as identified be kept as open natural spaces where the indigenous species can be conserved. An ecological management plan must be developed for these sensitive areas to be actively managed and overseen by the owners of the proposed development.
- A strong “indigenous only” approach must be followed with landscaping and as many as possible existing indigenous vegetation will be incorporated into the development.
- A green architectural approach must be proposed (in terms of water saving, electricity saving, restriction of light pollution, etc.).
- The North West Gateway Project must be planned in a legal, pro-active and structured manner taking all development components, environmental features, site potential and restrictions into account.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on the Magaliesberg Biosphere Reserve	Regional	Permanent	Unlikely	Low	Low	None

Impact on groundwater

Impact

- Poor design and construction techniques will result in structural failures and subsequent leaks, specifically in terms of the sewage system and the filling station.
- Vegetation has a filtering effect. Where the land is cleared of vegetation, the groundwater is more susceptible to dissolved substances.

Mitigation

- *General mitigation for the engineering services*
 - The design standards to be followed for the design of all the civil engineering services must be in accordance with the standards specified in the “Guidelines for Human Settlement Planning and Design” and the “Guidelines for the Provision of Engineering Services and Amenities in Township Development, The Red Book.
 - Standards to which the electrical design must adhere to, include the relevant SABS safety and equipment standards, as well as the NRS 048 Quality of Supply Standard.
 - All engineering designs must address the conditions as stipulated in the water use authorisation obtained from the Department of Water and Sanitation.

- A **Groundwater Monitoring Plan** for the sewage structures must be identified that include the following :
 - Establishment of two boreholes (directly upstream and downstream from the WWTW).
 - Baseline data must be obtained prior to commencement of construction.
 - Groundwater samples must be collected from the boreholes for water quality monitoring purposes.
- The implementation of the **Landscaping and Plant Plan** referred to below under the heading '*Impact on the watercourse and natural habitat (fauna & flora)*' will ensure that the vegetation influence the water quality by binding soils thus protecting the surface layer, and by intercepting surface run-off thus buffering the lower-lying non-perennial drainage lines against suspended and dissolved substances. Vegetation has a filtering effect.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on groundwater	Local	Medium	Possible	Moderate	High	None

Increased run-off resulting in erosion and a loss of soil

Impact

- Urban development is characterised by large areas of sealed surfaces such as roads, houses etc. Infiltration is considerably reduced and an increase in surface run-off is normally evident.
- Construction activities associated with urban development can lead to massive short-term erosion unless adequate measures are implemented to control surface run-off.
- Sheet erosion occurs when run-off surface water carries away successive thin layers of soil over large patches of bare earth. This type of erosion is most severe on sloping soils, which are weakly structured with low infiltration, which promotes rapid run-off. It occurs on the site where vegetation has been destroyed.
- Vegetation influences the quantity of run-off by intercepting rainfall, promoting infiltration and thus decreasing run-off. This will not happen where the soil is cleared of vegetation.
- Continual erosion in sheet-eroded slopes is a common cause of gully erosion. Gully erosion results from increased flow along a drainage line, especially where protective vegetation has been removed and soils are readily transported. A gully has steep, bare sides and is often narrow and deep. Once formed, a gully usually spreads upstream through continual slumping of soil at the gully head.

Mitigation

- All storm water generated by the development must be appropriately managed.
- A **Stormwater Management Plan** must be compiled by a suitably qualified engineer that addresses the following:
 - The storm water drainage network system must be kept separate from the waste water

(sewage) system.

- No pollutant or any harmful substance may be allowed to be released into the system via the storm water pipeline. The system must be designed to remove any waste or harmful substances before reaching the watercourse system.
- Drainage must be controlled to ensure that runoff from the site will not culminate in off-site pollution or result in gully erosion in the watercourse/drainage areas.
- The storm water system must be designed such that no large amount of water is released into the watercourse system at one point only and the force of the water must be reduced to prevent erosion.
- Sheet flow should be directed into onsite infiltration trenches, filter drains and filter strips rather than gullies and pipes.
- A green approach such as Infrastructure and Sustainable Urban Drainage (SUD) principles is proposed to be implemented as far as practical to ensure that the surface areas for driveways and parking areas are permeable to increase infiltration.
- Severely eroded areas should be stabilised with gabions and/or reno mattresses with sediment trapping material. The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site.

Landscape Rehabilitation and Plant Plan

- The **Landscape Rehabilitation and Plant Plan** referred to under the impact “Impact on the watercourse and natural habitat (fauna & flora)” must be implemented the construction phase while all equipment and personnel are on site.
- In terms of erosion it should specifically address the following :
 - Vegetation will reduce the speed of run-off, suspended particles can settle out and dissolve substances such as nutrients, can be assimilated by plants. The vegetation has a filtering effect.
 - The timing of clearing activities is of vital importance. Clearing activities and earth scraping should preferably be restricted to the dry season to prevent erosion and siltation. The dry months are also the period when most species are either dormant or finished with their breeding activities.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increased run-off resulting in erosion and a loss of soil	Site	Permanent	Probable	Moderate	Moderate	Low

Impact

Cultural-Heritage

During the site survey for the Heritage Impact Assessment eight sites of cultural heritage significance were identified. They will be destroyed because they fall within the development area. Mitigation measures could however soften the impact.

This site includes an informal gravesite; stone and clay houses, storage buildings and a farm yard.

Palaeontological Environment

A Palaeontology Impact Assessment concluded that no fossils are preserved in the igneous rocks of the Vlakfontein subsuite but there is a very small chance that trace fossils might be found in the hard sandstones of the Magaliesberg Formation, such as *Manchuriophycus*.

Mitigation

Cultural-Heritage

- One informal graveyard
 - The graves must be kept *in situ*.
 - An area of at least 225m² must be fenced to ensure protection of the existing graves.
 - This area must be indicated as a separate erf in the Site Layout Plan and must have an appropriate zoning.
 - A management plan for the sustainable utilisation and preservation of the site needs to be drafted and submitted to SAHRA for their approval.
- Three site with remains of stone and clay houses
 - The remains of all three stone and clay houses must be documented and included in the heritage register.
 - Only one site should be mitigated as follows:
 - Test excavations must be done
 - A site map must be compiled
 - All three structures may be demolished, but only after the above was done and after the necessary permit was obtained from the relevant heritage authority.
- Three sites with remains of storage buildings
 - Destruction of the sites may be granted at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.
- One site which is a farm yard
 - Destruction of the sites may be granted at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.
- The North West PHRA requires that an application form has to be completed and proof of

payment need to be provided for all structures older than 60 years as these are protected under section 34 of the NHRA.

Palaeontological Environment

- A Monitoring Programme for Palaeontology must commence once the excavations begin. Note however that this procedure is only required if fossils are seen on the surface and when excavations for foundations and infrastructure commence.
- The monitoring programme if required involves the following :-
 - When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils) should be put aside in a suitably protected place. This way the building activities will not be interrupted.
 - Photographs of similar trace fossils must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. This information is must be built into the training and awareness plan and procedures of the Environmental Management Plan.
 - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
 - If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
 - Trace fossils (not mud cracks or ripple marks) that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
 - If no good fossil material is recovered then the site inspections by the palaeontologist will not be necessary. Annual reports by the palaeontologist must be sent to SAHRA.
 - If no fossils are found and the excavations have finished then no further monitoring is required.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on cultural-heritage environmental	Site	Permanent	Definite	Severe	Very high	None
Impact on paleontological environment	Site	Permanent	Definite	Moderate	Moderate	Low

Impact

The township will change the existing visual character of the site from a rural landscape to a site with built-up and natural as well as landscaped areas.

The Visual Impact Assessment conducted for the township concluded the following :

- The study areas scenic quality has been rated high within the context of the sub-region and sensitive viewing areas mapped indicating potential sensitivity to the proposed development within a 3 km radius of the development site. Impacts to views are the highest when viewers are identified as being sensitive to change in the landscape, and their views are focused on and dominated by the change. Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or from tourism / conservation areas, travel routes, and important cultural features and historic sites, especially in foreground views.
- Sensitivity to this development is low and the intrusive nature of project components is also rated low as the project will be mostly screened and absorbed into the landscape scene by existing vegetation and topography. The project would not be visible from the viewing site on the Hartebeespoort Dam wall as it would be screened by existing vegetation growing on properties east of the development site. Views from residential properties to the south and south west of the site would have elevated views of the project site but many of these would be partially or totally screened by existing tall trees. The township would be highly visible from the upper elevations of the Magaliesberg. However, it would be seen by relatively few people and it would always appear in the same visual envelope as existing development about the R104 and R512 intersection. Views from the Magaliesberg always comprise a combination of cultural, natural and man-made landscapes i.e. they are not of pristine or wilderness natural areas. The development would therefore not be out of place given this context i.e. the viewer would most likely not be sensitive to the development.
- It is therefore predicted that low (i.e. a minor loss of or alteration to key elements / features / characteristics of the baseline) visual resource impacts would result from the construction, operation and maintenance of the proposed development.

Mitigation

Mitigation measures should be designed to suit the existing landscape character and needs of the locality. They should respect and build upon landscape distinctiveness. General mitigation measures are proposed as well as mitigating the night-time impact of lights. The following general actions are recommended:

Planning and site development

During construction activities, the minimum amount of existing vegetation and topsoil should be removed. Ensure, wherever possible, natural vegetation is retained and incorporated into the site

rehabilitation. All top-soil that occurs within the proposed footprint of an activity must be removed and stockpiled for later use.

Earthworks

Earthworks should be executed in such a way that only the footprint and a small 'construction buffer zone' around the proposed activities is exposed.

Building and parking platforms should be designed to follow the contours and not be perpendicular to them.

In all other areas, the natural occurring vegetation, more importantly the indigenous vegetation should be retained, especially along the periphery of the site.

Landscaping and ecological approach

When new vegetation is introduced to the site, an ecological approach to rehabilitation and vegetative screening measures, as opposed to a horticultural approach to landscaping should be adopted. For example, communities of indigenous plants enhance biodiversity and blend well with existing Magaliesberg vegetation (Savanna biome). This approach can significantly reduce long term costs as less maintenance would be required over conventional landscaping methods as well as the introduced landscape being more sustainable.

Structures and associated infrastructure

Paint structures with colours that reflect and compliment the natural colours of the surrounding landscape. To further reduce the potential of glare, the external surfaces of structures should be articulated or textured to create interplay of light and shade.

Lighting

Light pollution is largely the result of bad lighting design, which allows artificial light to shine outward and upward into the sky, where it's not wanted, instead of focusing the light downward, where it is needed. Ill designed lighting washes out the darkness of the night sky and radically alters the light levels in rural areas where light sources shine as 'beacons' against the dark sky and are generally not wanted.

Of all the pollutions faced, light pollution is perhaps the most easily remedied. Simple changes in lighting design and installation yield immediate changes in the amount of light spilled into the atmosphere. The following are measures that must be considered in the lighting design:

- Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the site.
- Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on illegal entry to the site.
- Minimise the number of light fixtures to the bare minimum, including security lighting.
- Wherever possible, lights should always be directed downwards to avoid illuminating the sky.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Visual Impact	Local	Permanent	Definite	Moderate	Moderate to low	Low

Increased traffic

Impact

- Increased traffic could cause a safety risk to road users in the area during both the construction phase (heavy construction vehicles without road upgrades yet in place) and during the operation phase (the township will create significant additional traffic to the area).
- Road surfaces could also be damaged as a result of regular heavy vehicle traffic during the construction period.

Mitigation

- All accesses, roads and pavements must be designed according to industry standards and the requirement of the Madibeng Local Municipality and the North West Province Department of Public Works and Road
- Temporary traffic control measures (manual control and signage) must be provided during the entire construction period.
- The conclusion on the impact of the development traffic on the dam wall is as follows:
 - The increase in average delay experienced for all vehicles in the base – and future year scenarios, due to the addition of the development traffic is deemed acceptable and should not have a detrimental effect on the dam wall per se.
- All upgrades to the main access roads as required by the transport engineer in the Traffic Impact Study as well as conditions stipulated by the North West Department of Public Works and Roads must be implemented.
 - Conversion of *Intersection 1* to a roundabout;
 - Implementation of roundabouts as intersection control measures at all four development accesses;
 - That the implementation of a staged crossing for the side road traffic to enter the free-flow traffic stream be evaluated at *Intersection 10*. This can seemingly be achieved by amending road markings on the R511;
 - That a formal walkway be provided along the most part of the development boundaries with Road P2/4 and the R513 (Road P251-1); and
 - That a bus/taxi bay be provided in front of the shopping centre (Erf 58) downstream from *Intersection 1* along Road P2/4.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increased traffic	Site	Permanent	Definite	Moderate	Moderate	Low

Loss of agricultural land

Impact

- The current land use is agriculture and an application for a mixed land use township has been made which will result in the loss of agricultural land.
- Important considerations in evaluation of the impact were :
 - Of the approximately 30ha potentially developable land for either township and/or legal agricultural activities, approximately 70% should be excluded due to the presence of the watercourse, riverine area and buffer zone; leaving only approximately 10ha of which the agricultural economic viability could be questioned. Furthermore, no water abstraction rights for agricultural purposes exist on the land.
 - The project site does not fall within the boundaries of an “Agricultural Hub”.
 - The town planning section of the Madibeng Local Municipality and Department of Agriculture had been approached for comment on the application. No comment and/or objection had been received.

Mitigation

No mitigation is proposed.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Loss of agricultural land	Site	Permanent	Definite	Low	Low	Low

CONSTRUCTION PHASE

Impact on the watercourse and natural habitat (fauna and flora)

Impact

Vegetation

- Impact is associated with the loss of plant species (including the loss of rare /medical species)
- No red data species were found where the township will be developed and it is highly unlikely that such species would be present due to the area being transformed.

- Numerous *Sclerocarya Birrea* (marula) trees might have to be removed during site clearance.
- Impact on vegetation during construction is mostly associated with unnecessary destruction to and loss of habitat which implies loss of plant and animal species which will ultimately result in a loss of biodiversity.
- Alien infestation occurs. Alien species poses a huge threat to the natural environment due to their competitive nature that leads to the displacement of natural indigenous species (plants and animals), and also due to their excessive use of soil water. Exotic and invasive plant species are categorised according to the framework laid out by The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) and National Environmental Management: Biodiversity Act (10/2004) (NEMBA). These acts define weeds as alien plants, with no known useful economic purpose that should be eradicated.

Fauna

- Impact on fauna is associated with placement of snares by labourers and loss of habitat

Watercourse

- Uncontrolled construction activities which extend into the watercourse and buffer area could occur and could result in water pollution, erosion and disturbance to downstream habitat and ecosystems.
- The protected geophyte *Boophone disticha* (a Red Dara specie), occurs within the watercourse area, but this is excluded from the development site.

Mitigation

General

- A properly qualified Environmental Control Officer (ECO) must be appointed to monitor all activities and to report any actions that could or potentially could have a negative effect on the environment. The ECO should also keep records of all actions related to the environmental management plan that should be available on site for inspection. It is also recommended that photographic records are kept before, during and after construction of the various activities.
- Labourers must be trained in basic environmental conservation principles (i.e no cutting of trees for firewood; no placement of snares; etc.)
- Labourers must at all times be supervised.
- The implementation of the **Landscape Rehabilitation and Plant Plan** designed during the Design and Pre-Construction Phase must be implemented.

Vegetation

- The ecologist must visit the site prior to commencement of any construction activities and he must mark all trees and clumps of trees that should be maintained, specifically in the *Vachellia torilis-berchemi zyeheri* woodland and the *Combretum apicultatum-Senegaia caffra* woodland which occurs north of the delineated riparian zone.
- All *Sclerocarya birrea* (marula) trees occurring on the entire project area must be identified

and clearly marked and documented so that a permit application could effectively be made for the trees which would be in the direct line of the construction activities. The Department of Agriculture, Forestry and Fisheries (DAFF) must be approached for the required permits.

- Conditions of the permits obtained for the removal or cutting of *Sclerocarya birrea* (marula) trees must be adhered to.
- Alien vegetation shall be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. All alien vegetation should be eradicated within the study site and invasive species as listed in the EIA report should be given the highest priority. The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. Application shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications. Where herbicides are used to clear vegetation, selective and biodegradable herbicides registered for the specific species should be applied to individual plants only. General spraying and the use of non-selective herbicides (e.g. Roundup, Mamba etc.) should be prohibited at all times.
- The Contractor shall prevent the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading of such invasive plants onto adjacent land as a result of construction activities.
- No clearing of vegetation outside the specified project area will be allowed.
- No person shall remove any indigenous plant for medicinal or other purposes unless the area is within the approved construction area.
- No trees in the surrounding area may be cut for firewood.

Fauna

- Fire arms and any other hunting weapons must be prohibited on site.
- No animals should be intentionally killed or destroyed. Severe contractual fines must be imposed and immediate dismissal of any contract employee who is found attempting to snare or otherwise harm remaining faunal species in the area must take place.

Watercourse

- The watercourse area with sensitive plant communities and buffer zone as identified by the ecologist must be pegged out prior to commencement of construction. All labourers should be made aware of the fact that no access is allowed within the pegged area. If necessary fines should be implemented.
- No construction activity is allowed within the regulated area (watercourse plus buffer zone) without water use authorisation in place.
- If construction is done during the wet months, the watercourse area should be protected against soil erosion with sandbags packed along its edge to prevent any soil washed into the system during rainfall events.
- The watercourse may not be used for any purpose whatsoever. Proper ablution and cooking facilities must be provided to the contractors.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on the watercourse	Site	Short term	Definite	Moderate	Moderate	None
Impact on fauna	Site	Short term	Definite	Low	Low	None
Impact on flora	Local	Medium	Probable	Moderate	Moderate	Low

Increased risk for groundwater pollution

Impact

- The risk for groundwater pollution during the construction period is generally associated with oil spills resulting from construction vehicles and placement of engineering structure.
- Poor waste management could also result in unnecessary impact on the groundwater and natural habitat.
- Should ineffective construction techniques and methods be used, it could lead the structural failure with associated risk to the environment.

Mitigation

Oil spills associated with construction activities

- Under no circumstance may groundwater be polluted.
- Construction vehicles may only be serviced in a bunded area on the depot site.
- Hazardous waste (i.e. oil contaminated waste to be moved to registered hazardous waste landfill site; adequate storage and labelling of hazardous materials on site).
- Storm water should not be discharged into the working areas and it should be ensured that storm water leaving the footprint of the proposed development areas is not contaminated by any substance, whether that substance is solid, liquid, vapour or any combination thereof.
- Under no circumstances is contaminated water allowed to be released onto the land or the watercourse area.
- Procedures for pro-actives measures as well as incident reporting and corrective action during spillages and emergency situations are provided in the Environmental Management Plan.

Waste Management during construction

Implementation of stringent waste management procedures for general household waste; construction waste; construction vehicle waste and sewage waste/disposal must be implemented.

Hazardous Waste

- Oil contaminated waste (soil, cloths used to clean small spills, spill kits, content of drip trays, etc.) must be disposed of at a facility that is registered as a hazardous landfill facility.
- All hazardous substances at the site must be adequately stored and accurately identified,

recorded and labelled.

- Hydrocarbon (oil, diesel, petrol) waste as well as hydrocarbon containing material must be regarded as hazardous waste and separated from general waste.
- Persons who remove hazardous waste must be appropriately qualified and authorized.
- The Department of Water and Sanitation must be notified within 24 hours about any incidents during construction or operations that may impact on water resources.

General Waste

- Littering or illegal dumping of any waste material is prohibited.
- No waste disposal holes may be made on site.
- Under no circumstances should waste be burnt on site.
- Waste separation should be encouraged for recycling purposes.
- Provision must be made for the collection of all general waste materials.
- Rubbish bags and bins must be provided on the construction site and must be emptied on a regular basis.
- The Contractor must remove the waste to a registered municipal landfill facility.
- Liquid waste (grey water) must be disposed with sewerage.

Construction Waste

- Compliance with stringent daily clean up requirements of site camp inert waste (waste concrete, reinforcing rods, wire, timber, etc.) and disposal at municipal waste disposal sites must take place.
- Construction waste must be collected and sold for recycling purposes.

Sewage

- No effluent may be dumped in the veld or streams in the macro area.
- Sewage waste (labourers to be provided with proper ablution facilities- either municipal or chemical toilets provided and serviced by a reputable outside company; no effluent to be dumped on adjacent land).
- Enough chemical toilets must be provided for the labourers to be placed at least 100m away from the watercourse and must be regularly serviced.

Construction techniques and methods of the Engineering Services Infrastructure

- Regular inspection of the construction site by the Project Engineer should take place to ensure that prescribed engineering specifications are followed.
- In order to prevent structural failure during the operational phase of the project (with subsequent risk to pollution of ground and surface water), the Project Engineer must inspect the foundation bedding of the pipelines before the pipes (specifically the sewer pipes) may be placed.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increased risk for groundwater pollution	Site	Temporary	Possible	Moderate	Moderate	None

Increased risk for erosion resulting from construction activities

Impact

- To cause the loss of soil by erosion is an offence under the Soil Conservation Act, Act No 76 of 1969.)
- The impact will occur where large areas of land are exposed and where stormwater is allowed to cascade freely across the site.
- Construction vehicles and insufficient construction roads could also result in erosion.

Mitigation

- The **Stormwater Management Plan** compiled during the Pres-Construction and Design Phase must be implemented.
- Access roads and site surfaces must be monitored for deterioration and possible erosion. Pro-active measures must be implemented to curb erosion and to rehabilitate eroded areas. All areas susceptible to erosion must be installed with temporary and permanent diversion channels and berms to prevent concentration of surface water and scouring of slopes and banks, thereby countering soil erosion.
- To reduce the risk of erosion, run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion towards the stream.
- Construction during the dry months of the year should be considered in order to overcome the problems caused by excessive moisture and prevent soil being washed away towards the lower-lying areas and the watercourse eco-system.
- If construction is done during the wet months, the watercourse area should be protected against soil erosion with sandbags packed along its edge to prevent any soil washed into the system during rainfall events.
- Rehabilitation and re-vegetation should preferably take place before commencement of the rainy season.
- Storm water control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. especially to avoid the export of soil into the water course.
- The storm water system must be constructed in such a way that the force of the water entering the watercourse system is broken to prevent any possibility of erosion taking place.
- Any erosion channels developed during the construction period or during site vegetation establishment period must be back-filled and compacted and the areas restored to a proper condition.
- The Contractor must at all times ensure that cleared areas are effectively stabilised to prevent and control erosion.

- Stockpiling of soils should take place as follows :-
 - Soil stockpiles must be protected from possible erosion, e.g. through covering of the stockpiles with tarpaulin and limiting the height and slope of the stockpile.
 - Soil stockpiles should not exceed 1m in height.
 - Soil stockpiles must be sufficiently away from drainage areas..
- Rehabilitation of the pipeline construction areas should take place as follows:-
 - All construction activities must be from sub-soil and must be replaced in the layers in which it was excavated (with the topsoil being the top-layer).
 - Excavations for trenches must be done portion by portion and covered as soon as a section of the pipe had been laid.
 - The area must be rehabilitated and reseeded after the pipeline has been laid.
 - Shaping (to blend into the landscape) and stabilisation of the slopes must be done via rock protection, topsoil redistribution, etc.
- No development activities may take place within the watercourse and buffer zone without water use authorisation for that specific activity in place.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increased risk for erosion resulting from construction activities	Local	Permanent	Probable	Moderate	Moderate	Low

Influx of labourers with associated crime, access control, risk for habitat destruction

Impact

An influx of workers could result in an increased risk for crime and safety to the adjacent landowners.

Uncontrolled labourers would cause disturbance to and destruction of natural habitat i.e. through placement of snares, cutting trees of firewood, etc.

Mitigation

- Labourers should be trained in general principles of environmental management that includes the following :
 - Removal of agricultural products is prohibited.
 - No plants may be collected.
 - No firewood may be collected.
 - No open fires are to be made.
 - No wandering on adjacent properties is allowed.
 - No access to the watercourse areas is allowed.
 - No watercourse may be used for any purpose (i.e. drinking water, washing, laundry, etc.)
 - The veld may not be used for any toilet needs.

- All construction workers will be allowed only for specified day light hours. Transport should be made available by the contractor to remove labourers from the site after working hours.
- Secure accommodation facilities must be provided for guarding personnel.
- All contractors and construction workers must be issued with temporary permits to enter the property. Copies of the their ID's and contact details of their next of kin and home addresses must be kept on site.
- Supervision of labourers must at all times take place.
- Construction hours must be restricted to specific periods and daylight hours that exclude Sundays and public holidays.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Influx of labourers with associated crime, access control, risk for habitat destruction	Local	Short term	Probable	Moderate	Moderate	None

Health & safety risk during construction

Impact

- Labourers could be injured resulting construction activities – using of heavy equipment; excavations; etc.
- Open excavations along the pipeline routes could result in injuries by people (or animals) falling into them.
- Blasting would possibly be required and this can cause a safety hazard to the public and also cause damage to structures on adjacent land.
- Increased traffic (including heavy construction vehicles) could cause a safety risk to road users in the area.

Mitigation

- All labourers must be issued with appropriate protective clothing (overalls, hard point shoes and reflective jackets) must at all times.
- Proper training of labourers should take place.
- The labourers should at all times be supervised.
- The pipelines foundation should be excavated and prepared, pipelines be placed and rehabilitated portion by portion to prevent anyone from falling into exposed excavated areas.
- All excavations on the site and along the services pipelines should be clearly marked with barrier tape.
- A First Aid kit to be used by trained personnel must at all times be kept on site.
- Appropriate signage and warnings must be placed on site.

- A Safety Officer should inspect the site at least once a month during construction to ensure compliance with safety requirements in terms of the Occupational Health & Safety Act.
- All adjacent landowners have to be informed of the blasting programme (if applicable) prior to any blasting taking place. Contractors must liaise personally with adjacent landowners. All communication in this regard must be documented. Blasting may only be undertaken by specialists in the field and should be limited to small localised areas. All relevant legislation must be adhered to.
- Effective and reasonable traffic control procedures (manual and signage) must be implemented during the entire construction period.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Health & safety risk to labourers	Site	Short	Possible	High	Moderate-high	None
Health & safety risk to public	Site	Short	Possible	High	Moderate-high	None

Impacts associated with construction activities such as noise and dust

Impact

Construction activities are generally associated with noise and dust. This impact should however be considered in context with the rural nature of the surrounding areas.

Mitigation

Noise

In the event that noise complaints are received, the following must be implemented :-

- Construction activities involving use of the service vehicle, machinery, hammering etc, must be limited to the hours between 7:00 am and 6 pm weekdays; 7:00 am and 1:30 pm on Saturdays; no noisy activities may take place on Sundays or Public Holidays.
- Activities that may disrupt neighbours (e.g. delivery trucks, excessively noisy activities etc.) must be preceded by notice being given to the affected neighbours at least 24 hours in advance.
- Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers, etc.) must be used as per operating instructions and maintained properly during site operations.

Dust

- Sweeping of construction sites, clearing of building rubble and debris and watering of construction areas (storage areas, roads, etc.) must take place at least once a day to prevent dust pollution as a result of construction activities.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Noise	Local	Short term	Unlikely	Low	Low	None
Dust	Local	Short terms	Probable	Moderate	Moderate	Low

OPERATIONAL PHASE

Continuous risk to the watercourse and natural habitat (fauna & flora)

Impact

- An increase in people to the area could result in disturbance to the watercourse system and the natural habitat in the open space areas.
- Failure of engineering structures and spills could result in pollution of the watercourse system

Mitigation

- All potential buyers into the township must be made aware that only low impact activities (i.e. hiking) will be allowed in the watercourse and buffer area. These activities must be confirmed and specified as part of the ecological management measures to be identified for the Private Open Spaces as prescribed in the Landscaping and Rehabilitation Plan under the Pre-Construction and Design Phase in the EMP.
- Continuous monitoring of the watercourse must take place to ensure that alien vegetation is controlled; that no erosion is evident and gullies are formed resulting from poor stormwater management; and that no water pollution is taking place.
- The owners of the township must actively implement the management measures for the operation and control of the Private Open Space areas in the township as identified in the Landscape Rehabilitation and Plant Plan.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Continuous risk to the watercourse and natural habitat (fauna & flora)	Local	Short term	Possible	Moderate	Moderate	Low

Continuous risk for ground and surface water pollution

Impact

Continuous risk from groundwater pollution during the operational phase is associated with

- Failure of the sewage infrastructure
- Failure of on-site storm water management structures - water containing pollutants from the landscape areas could enter the storm water system and be released onto the land.

Mitigation

The *Groundwater Monitoring Programme* as compiled in the Design & Pre-Construction Phase must be implemented to ensure that pollution is detected as soon as possible once it has occurred and that measures to rectify the situation are identified and implemented as soon as possible.

Sewage Infrastructure

Regular monitoring of the sewage pipelines and sewage works must be undertaken to detect any sewage leakage along the pipeline into the watercourse system. Any leakages must immediately be reported and repaired.

All conditions for the operational phase in terms of the water use authorisation for the sewage system as issued by the Department of Water and Sanitation must be implemented.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Continuous risk for ground and surface water pollution	Local	Permanent	Possible	Moderate	Moderate	None

Increased run-off resulting in erosion

Impact

This impact is mainly associated with poor stormwater management which results in a loss of soil which is an offence in terms of the Soil Conservation Act, Act No 76 of 1969).

Mitigation

Regular monitoring of the township is required to establish the effectiveness of the stormwater management structures. Should any signs of erosion be detected, appropriate measures to rectify the situation must be implemented in consultation with a suitably qualified expert.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increase run-off resulting in erosion	Local	Permanent	Possible	Moderate	Moderate	Low

Increased traffic

Impact

Increased traffic could cause a safety risk to road users in the area and will place additional strain on road surface areas.

Mitigation

- All accesses, roads and pavements must be monitored and maintained according to industry standards.
- All operational requirements in terms of roads, accesses and maintenance as supplied by the Madibeng Local Municipality and the North West Province Department of Roads and Transport must be met.
- All permanent traffic control measures must be monitored and maintained.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increased traffic	Local	Permanent	Definite	Moderate	Moderate	Low

Increased pressure on municipal infrastructure

Impact

Some engineering services would connect to the municipal network (i.e. water supply and waste management); resulting in additional pressure on the infrastructure.

Mitigation

- The Applicant must pay a significant contribution to the upgrade and maintenance of municipal services.
- The Applicant should commit to promoting the following environmentally sustainable principles:
 - Green technologies to be incorporated in the design of the buildings, i.e.:
 - Proper insulation of the ceilings is required, because as much as 50% of heat losses in a building can be attributed to a lack of ceilings and ceiling insulation. This will significantly reduce heating and cooling expenses.

- The architectural design should ensure that proper natural flow of air into and out of the buildings occur deliberately as ventilation.
- Energy efficient heaters and air conditioners should be purchased.
- Conservation of energy or the utilisation of renewable and sustainable energy technologies is encouraged. This includes solar panels that generate and store electricity in suitable battery packs, solar water heater(s), backed up with gas, as well as gas appliances.
- Compact fluorescent lights lamps are recommend instead of ordinary bulbs for all light required for non-security purposes. Fluorescent lamps give five times the light and last up to 10 times as long as ordinary bulbs.
- The installation of gas appliances rather than electrical appliances must be encouraged.
- Convection ovens should also be installed as they use less energy than conventional ovens and cooking time is substantially reduced.
- Solar water heater(s) conserve energy and can be backed up with gas or electric geysers.
- Installing a geyser blanket on geysers and hot water storage tanks will reduce the amount of heat lost by the geyser to cold air outside and thus conserves energy.
- Hot water pipes should be insulated to prevent heat loss.
- The outdoor cooling units must be protected from the sun. They should therefore be placed on the southern sides of the buildings.
- The collection of stormwater from the roofs of the buildings for irrigation should be encouraged.

Recyclable waste management should include the following during the operational phase :-

- An designated area in the township should be identified where waste can be sorted and stored for collection must be identified;
- The waste collection area must have a concrete surface and it must be under roof (for protection against rain, stormwater runoff and fire)
- The site must be accessible for collection vehicles.
- A dedicated worker must be trained in the recycling of waste (baling; compaction; breaking of glass, etc.) to ensure effective recycling of relevant material.
- These recycling waste sites on each stand must be regularly cleaned and disinfected.
- It is proposed that the applicant contact glass, plastic and can recycling companies for collection of relevant waste and set up of proper agreements i.e. when; how often; etc.

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Increased pressure on municipal infrastructure	Local	Permanent	Probable	Moderate	Moderate	Low

6.3.2 Environmental Management Plan

The main objectives of the EMP are to identify actions and mitigation measures to minimise expected negative impact and enhance positive impact during all development phases (design/pre-construction, construction, and post-construction/operation) in terms of community issues, construction site preparation, construction workers, habitat protection, security, etc. Communication channels and contact details must also be provided.

According to the NEMA 2014 Regulations, Appendix 4, an EMPr must comply with section 24N of the Act and include :-

- (a) details of (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
- (b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
- (c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
- (d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-
 - (i) planning and design;
 - (ii) pre-construction activities;
 - (iii) construction activities;
 - (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;
- (e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);
- (f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to
 - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
 - (ii) comply with any prescribed environmental management standards or practices;
 - (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
 - (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;
- (g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
- (h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
- (i) an indication of the persons who will be responsible for the implementation of the impact

- management actions;
- (j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
 - (k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
 - (l) a program for reporting on compliance, taking into account the requirements as prescribed by the regulations;
 - (m) an environmental awareness plan describing the manner in which-
 - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and
 - (n) any specific information that may be required by the competent authority.

Identified impacts and mitigation will be monitored through the application of the Environmental Management Plan (EMP) that is included as Appendix F(1) of this Environmental Impact Report.

6.4 Conclusion of Impact Assessment

6.4.1 Conclusion

- As can be seen from the summary tables below, all identified impacts can be mitigated to acceptable levels.
- The impacts assessed include issues raised by the different specialists as well as other impacts as identified by the EAP.
- All natural, social and cultural functions and processes will be able to continue *after* mitigation measures have been applied.
- No substantial impact *after* mitigation has been applied is expected to occur.
- The impact of this project can, in general, be seen as minimal.
- All the mitigation measures are included in the Environmental Management Plan, which means that the Applicant is legally bound to follow the recommendations.

6.4.2 Summary of Impact Assessment Tables

Design and Pre-construction Phase

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on the watercourse	Local	Long term	Definite	Moderate	Moderate	Low
Impact on the fauna & flora	Site	Medium term	Definite	Moderate	Moderate	Low
Impact on the Magaliesberg Biosphere Reserve	Regional	Permanent	Unlikely	Low	Low	None
Impact on groundwater	Local	Medium	Possible	Moderate	High	None
Increased run-off resulting in erosion and a loss of soil	Site	Permanent	Probable	Moderate	Moderate	Low
Impact on cultural-heritage environmental	Site	Permanent	Definite	Severe	Very high	None
Impact on paleontological environment	Site	Permanent	Definite	Moderate	Moderate	Low
Visual Impact	Local	Permanent	Definite	Moderate	Moderate to low	Low
Increased traffic	Site	Permanent	Definite	Moderate	Moderate	Low
Loss of agricultural land	Site	Permanent	Definite	Low	Low	Low

Construction Phase

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
Impact on the watercourse	Site	Short term	Definite	Moderate	Moderate	None
Impact on fauna	Site	Short term	Definite	Low	Low	None
Impact on flora	Local	Medium	Probable	Moderate	Moderate	Low
Increased risk for groundwater pollution	Site	Temporary	Possible	Moderate	Moderate	None

Increased risk for erosion resulting from construction activities	Local	Permanent	Probable	Moderate	Moderate	Low
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Influx of labourers with associated crime, access control, risk for habitat destruction	Local	Short term	Probable	Moderate	Moderate	None
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Health & safety risk to labourers	Site	Short	Possible	High	Moderate-high	None
Health & safety risk to public	Site	Short	Possible	High	Moderate-high	None

Noise	Local	Short term	Unlikely	Low	Low	None
Dust	Local	Short terms	Probable	Moderate	Moderate	Low

Operational Phase

Impact Description	Extent	Duration	Probability	Magnitude / Intensity	Significance without mitigation	Significance after mitigation
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Continuous risk to the watercourse and natural habitat (fauna & flora)	Local	Short term	Possible	Moderate	Moderate	Low
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Continuous risk for ground and surface water pollution	Local	Permanent	Possible	Moderate	Moderate	None
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Increase run-off resulting in erosion	Local	Permanent	Possible	Moderate	Moderate	Low
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Increased traffic	Local	Permanent	Definite	Moderate	Moderate	Low
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Increased pressure on municipal infrastructure	Local	Permanent	Probable	Moderate	Moderate	Low
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7.1 *Environmental Impact Statement*

The following key issues should be considered to allow for informed and responsible decision-making:

Proposed Township Layout

The proposed layout recommended for approval had been guided and influenced by the following key issues:

- The ecologist for the township identified the watercourse with riparian and sensitive vegetation with a 15m buffer zone to be excluded from the development area. This allows for a significant portion of the property to be conserved which is way bigger than the 1:100 year flood line. This is indicated as a “Natural Watercourse and Riparian Area” in the township.
- The heritage impact assessment undertaken confirmed the existence of a small informal graveyard. A dedicated erf has been identified according to requirement supplied by the cultural- heritage consultant to ensure the protection of these existing graves.
- During the WULA Pre-Application Meeting, the Department of Water and Sanitation confirmed that, the Department would allow the portion of the watercourse between the “Natural Watercourse and Riparian Area” and the road to be canalised. Stormwater run-off from the mountain is already channelled underneath the road into a hand-dug stormwater channel to accumulate the run-off into the natural water course on the site. The canalised watercourse/culvert is indicated on the layout plan as a “Channelled Watercourse”.
- Four accesses to the township are required by the North West Province Department of Road and Transport. The exact positioning thereof accommodates the safe distance between each other and the Damdoryn traffic lights as per legal requirement.
- Allowance had to be made to allow for an access road to be used by the Department of Water and Sanitation for their large trucks for maintenance of the dam wall and outlet structures, specifically the large radial gates. The road will be controlled with a locked gate by DWS who will also be responsible for the maintenance of the road.

Impact on the Magaliesberg Biosphere Reserve

The proposed township is situated within the demarcated buffer zone of the Magaliesberg Biosphere Reserve (outside the core and transitional areas of the biosphere). The most important ecosystem in this area is the Magaliesberg mountain. It is however not expected that the township as proposed will impact negatively on the Magaliesberg Biosphere Reserve because of the following:

- This project site is not situated on the mountain, but on the plains north of the mountain.

- The project area is largely isolated due to surrounding developments. It is separated from the mountain via a provincial road.
- The township components are to a large extent an extension of existing land use and or are compatible with other development within the macro area.
- Environmental sensitivities of the site had been identified and the ecological sensitivity map provided by the ecologist subsequently guided the layout of the township.
- The total site is ±30 hectares. It is estimated that approximately 70% of the total site will eventually be either natural open space or landscaped indigenous gardens. This area includes the water course and sensitive riparian and plant communities with a significant buffer zone.

Visual Impact

The potential visual impact was a concern raised by the South African Heritage Resources Agency (SAHRA). A Visual Impact Assessment was subsequently conducted and it concluded the following:

- Sensitivity to this development is low and the intrusive nature of project components is also rated low as the project will be mostly screened and absorbed into the landscape scene by existing vegetation and topography.
- The project would not be visible from the viewing site on the Hartbeespoort Dam wall as it would be screened by existing vegetation growing on properties east of the development site. Views from residential properties to the south and south west of the site would have elevated views of the project site but many of these would be partially or totally screened by existing tall trees. The township would be highly visible from the upper elevations of the Magaliesberg. However, it would be seen by relatively few people and it would always appear in the same visual envelope as existing development about the R104 and R512 intersection.
- Views from the Magaliesberg always comprise a combination of cultural, natural and man-made landscapes i.e. they are not of pristine or wilderness natural areas. The development would therefore not be out of place given this context i.e. the viewer would most likely not be sensitive to the development.
- It is predicted that low visual resource impacts would result from the construction, operation and maintenance of the proposed development.

Community Consultation

- A comprehensive Public Participation Programme was undertaken for this project and significant measures were taken to identify all relevant stakeholders and enable them to supply informed comment on the township application.
- No objections had been received from any of the Stakeholders and Interested & Affected Parties.
- Significant measures had been taken to address all comment and concerns received. It is the opinion of the EAP that all concerns raised had been addressed in a satisfactory manner.

- Based on the above it is suggested that the proposed township development is not unwanted in the area.

Conclusive Impact Statement

- The Environmental Impact Assessment Table provided in this report illustrates effectively that all identified impacts can be mitigated to acceptable levels.
- All natural, social and cultural functions and processes will be able to continue *after* mitigation measures have been applied.
- All the mitigation measures are included in the Environmental Management Plan, which means that the Applicant is legally bound to follow the requirements.
- The following positive environmental impacts are associated with the project:-
 - Unutilised land will be developed to its full potential.
 - A safe residential environment will be created.
 - The proposed facilities in terms of healthcare will be the niche product of the township, because it will provide a diverse range of medical services which entails an Alzheimer nursing home, convalescent home and auxiliary home, psychiatric ward as well as a hospital and pharmacy. This will address the need for upgraded medical facilities in the province and will provide an essential service to the area.
 - The township will provide additional job opportunities during construction and operational phases of the project.
 - The application will contribute to the promotion of a diverse combination of land uses that enables a greater intensity of mixed-use development in line with the planning principles.
 - The application will provide residential opportunities close to working opportunities in the macro area (tourism, mining and agriculture).
 - With the development of the township, measures will be in place to protect the watercourse and natural habitat which is at present not possible.

It is therefore the informed and carefully considered opinion of the EAP that all expected negative impact associated with this proposed project can be mitigated to acceptable levels with the implementation of the Environmental Management Plan included as Appendix F of the Environmental Impact Report. The expected positive impact outweighs the negative impact associated with this project.

7.2 Recommendations by the EAP

It is the professional and objective opinion of the independent EAP that the following is relevant:

- All reasonable actions had been taken to identify relevant environmental components.
- The environmental specialist input obtained up to date is comprehensive and effective in providing an assessment of the status quo of the study area; potentially sensitive areas and issues of concerns to be considered during consideration of alternatives.
- Significant and reasonable actions were taken to identify and notify all Interested &

Affected Parties that include government departments, relevant authorities, general stakeholders and affected landowners of the project.

- The Environmental Impact Report includes all proceedings, findings and recommendations from the Environmental Impact Phase.
- All relevant legal requirement in terms of the Environmental Impact Phase as per the Environmental Impact Assessment Regulations published on 4 December 2014 of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended had been complied with.

The proposed North West Gateway Project is planned in a legal, pro-active and structured manner taking all development components, environmental features, site potential and restrictions into account. The EAP can therefore recommend this Environmental Impact Report for approval and Environmental Authorisation by the North West Department of Rural, Environment and Agricultural Development.

It is recommended that the following stipulations be included in the Environmental Authorisation:-

- All the conditions of the Environmental Management Plan included in Appendix F of the Final Environmental Impact Report should form part of the conditions of the Environmental Authorisation.
- All the conditions of the Water Use License, once it is issued by the Department of Water & Sanitation should form part of the conditions of the Environmental Authorisation.
- The Environmental Authorisation should be valid for a period of 10 years during which construction must commence.

7.3 Affirmations by the EAP

AFFIRMATION

We, Annelize Grobler and Susanna Nel, hereby confirm the following:

- The information contained in this report is to the best of our knowledge and experience correct.
- All relevant comment and input provided by the stakeholders and I&APs are included and addressed in this EIR.
- Input and recommendations from the specialist reports are provided in and integrated with the EIR.
- All information made available by the EAP to I&APs and any responses thereto as well as comment and input from I&APs are provided in the EIR.



Annelize Grobler



Susanna Nel

Date: 20 March 2019