Draft Basic Assessment Report

Portion 174 of the Farm Goederede 60 JS, Proposed Expansion of the Bhundu Inn Hotel

Reference Number: 17/2/3N-388

*This draft report is available for public review from **12 November 2014**. Please submit written comments to NuLeaf Planning and Environmental by no later than **12 December 2014**.*

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Prepared for: PAUL MOJAPELO

Prepared by:

NuLeaf PLANNING & ENVIRONMENTAL

For submission to:

the dedet
Department:
Economic Development, Environment and Tourism
MPUMALANGA PROVINCIAL GOVERNMENT

the dedet

Department:
Economic Development, Environment and Tourism
MPUMALANGA PROVINCIAL GOVERNMENT

Basic Assessment Report in terms of the
Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998(Act No. 107 of 1998), as amended.

(For applicant / EAP to complete)

File Reference Number:	17/2/3N-388
Project Title:	Proposed Expansion of the Bhundu Inn Hotel
Name of Responsible Official:	Selape Letswane

(For official use only)

NEAS Reference Number:	
Date Received:	

Kindly note that:

1. Required information must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. Tables can be extended as each space is filled with typing.

2. Where applicable **black out** the boxes that are not applicable in the form.

3. An incomplete report may be returned to the applicant for revision.

4. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

5. All reports (draft and final) must be submitted to the Department at the address of the relevant **DISTRICT OFFICE** given below or by delivery thereof to the relevant **DISTRICT OFFICE**. Should the reports not be submitted at the relevant district office, they will not be considered.

6. No faxed or e-mailed reports will be accepted.

7. One copy of the draft version of this report must be submitted to the relevant district office. The case officer may request more than one copy in certain circumstances.

8. **Copies of the draft report must be submitted to the relevant State Departments / Organs of State for comment.** In order to give effect to Regulation 56(7), proof of

submission/delivery of the draft documents to the State Departments / Organs of State must be attached to the draft version of this report.

9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

10. All specialist reports must be appended to this document, and all specialists must complete a declaration of independence, which is obtainable from the Department.

DEPARTMENTAL DETAILS

HEAD OFFICE (18 Jones Street, Nelpruit)	**EHLANZENI DISTRICT (50 Murray Street, Nelspruit)**	**NKANGALA DISTRICT (Pavilion Centre, Cnr Botha & Northey Streets, Witbank)**	**GERT SIBANDE DISTRICT (13 De Jager Street, Ermelo)**
Attention: Directorate: Environmental Impact Management Private Bag X 11215 Nelspruit, 1200 Queries should be directed to the Directorate: Environmental Impact Management at: Tel: (013) 759 4000 Fax (013) 759 4165	Attention: Directorate: Environmental Impact Management Private Bag X 11215 Nelspruit, 1200 Queries should be directed to the Directorate: Environmental Impact Management at: Tel: 0824068831 Fax: Email: nvmdhluli@mpg.gov.za	Attention: Directorate: Environmental Impact Management P. O. Box 7255 Witbank, 1035 Queries should be directed to the Directorate: Environmental Impact Management at: Tel: 0136902595/6901358/0766441707 Fax: Email:dtswai@wit.mpu.gov.za	Attention: Directorate: Environmental Impact Management P. O. Box 2777 Ermelo, 2351 Queries should be directed to the Directorate: Environmental Impact Management at: Tel: 0178192828/9 0178114815 0798419582 Fax: E mail:stmarabane@mpg.gov.za

Applications to be sent direct to district office

SECTION A: BACKGROUND INFORMATION

Project applicant:	Paul Mojapelo		
Trading name (if any):			
Contact person:	Paul Mojapelo		
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Environmental Assessment Practitioner:	NuLeaf Planning and Environmental (Pty) Ltd		
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Qualifications:	Bachelor Degree: Landscape Architecture (1995)		
Professional affiliations (if any):	Professional Member: South African Council for the Landscape Architectural Profession		

SECTION B: DESCRIPTION OF THE PROPOSED ACTIVITY

Describe the activity, which is being applied for, in detail. The description must include the size of the proposed activity (or in the case of linear activities, the length) and the size of the area that will be transformed by the activity.

The activity consists of the expansion of the existing Bhundu Inn Hotel on Portion 174 of Farm Goederede 60 JS.

The Bhundu Inn Hotel is located within the Thembisile Hani Local Municipality which falls under the Nkangala District Municipality. Bhundu Inn Hotel shares a common boundary with the SS Skosana Nature Reserve to the north west and the Mabusa Nature Reserve is located approximately 7 Km south east. The Moses River flows along the Eastern boundary of the Bhundu Inn Hotel site. A wetland fed by a spring is also located on the site.

Portion 174 of the Farm Goederede 60 JS covers approximately 27 Ha of land, this consists mainly of undeveloped land, with the exception of the existing Bhundu Inn Hotel which has a total of 50 rooms (100 beds) and staff quarters.

The proposed project, for which Environmental Authorisation is required, includes the following basic activities:

- The expansion of the existing Bhundu Inn Hotel from 50 rooms to 250 rooms (2 beds

each) and the construction of 10 self-catering chalets (4 beds each) as well as conferencing facilities for up to 600 people.
- Upgrade of all civil and service structures i.e. electricity, water and sewerage.

The total footprint of the development is estimated to be 11614.16 square meters.

SECTION C: PROPERTY/SITE DESCRIPTION

Provide a full description of the preferred site alternative (farm name and number, portion number, registration division, erf number etc.):

Portion 174 of the Farm Goederede 60 JS, Mpumalanga Province
21 digit SG Number: T0JS00000000006000174

Indicate the position of the activity using the latitude and longitude of the centre point of the preferred site alternative. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection. The position of alternative sites must be indicated in Section B of this document.

Latitude (S):		**Longitude (E):**	
25°	17.905'	29°	3.276'

In the case of linear activities:

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):		Longitude (E):	
°	'	°	'
°	'	°	'
°	'	°	'

SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as an appendix to this document.

The site or route plans must be at least A3 and must include the following:

6.1 a reference no / layout plan no., date, and a legend / land use table
6.2 the scale of the plan which must be at least a scale of 1:2000;
6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
6.4 the exact position of each element of the application as well as any other structures on the site;
6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
6.6 all indigenous trees taller than 1.8 metres and all vegetation of conservation concern (protected, endemic and/or red data species);
6.8 servitudes indicating the purpose of the servitude;

6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
- watercourses and wetlands;
- the 1:100 year flood line;
- ridges;
- cultural and historical features;

6.9 10 metre contour intervals

SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached as an appendix to this form**.**

FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as an appendix for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

SECTION D: BASIC ASSESSMENT REPORT

Prepare a basic assessment report that complies with Regulation 22 of the Environmental Impact Assessment Regulations, 2010. The basic assessment report must be attached to this form and must contain all the information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 25, and must include:

	(Checklist for official use only)
1. A description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.	
2. An identification of all legislation and guidelines that have been considered in the preparation of the basic assessment report.	
3. Details of the public participation process conducted in terms of Regulation 21(2)(a) in connection with the application, including – (i) the steps that were taken to notify potentially interested and affected parties of the proposed application; (ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given; (iii) a list of all persons, organisations and organs of state that were registered in terms of regulation **55** as interested and affected parties in relation to the application; and (iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	
4. A description of the need and desirability of the proposed activity;	

5. A description of any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity;	
6. A description and assessment of the significance of any environmental impacts, including— (i) cumulative impacts, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the activity; (ii) the nature of the impact; (iii) the extent and duration of the impact; (iv) the probability of the impact occurring; (v) the degree to which the impact can be reversed; (vi) the degree to which the impact may cause irreplaceable loss of resources; and **(vii)** the degree to which the impact can be mitigated;	
7. Any environmental management and mitigation measures proposed by the EAP;	
8. Any inputs and recommendations made by specialists to the extent that may be necessary;	
9. A draft environmental management programme containing the aspects contemplated in regulation **33**;	
10. A description of any assumptions, uncertainties and gaps in knowledge;	
11. A reasoned opinion as to whether the 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	
12. Any representations, and comments received in connection with the application or the basic assessment report;	
13. The minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants;	
14. Any responses by the EAP to those representations, comments and views;	
15. Any specific information required by the competent authority; and	
16. Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	

The basic assessment report must take into account –

(a) any relevant guidelines; and
(b) any departmental policies, environmental management instruments and other decision making instruments that have been developed or adopted by the competent authority in respect of the kind of activity which is the subject of the application.

** In terms of Regulation 22(4), the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub regulation 22(2)(h), exist.*

Have reasonable and feasible alternatives been identified, described and assessed?	YES	
If NO, the motivation and investigation required in terms of Regulation 22(4) must be attached as an Appendix to this document		

SECTION E: CONSULTATION WITH OTHER STATE DEPARTMENTS

Provide a list of all State Departments / Organs of State that have been consulted and registered as interested and affected parties, and to whom draft reports have been submitted for comment. **Proof of submission / delivery of the draft report to all State Department / Organs of State must be attached to this document.**

Department:	Mpumalanga Department of Economic Development, Environment and Tourism		
Contact person:	Selape Lentswana		
Postal address:	Private Bag X 11215, Nelspruit		
Postal code:	1200	**Cell:**	
Telephone:	013 692 7934	**Fax:**	013 766 1614
E-mail:	lsmatawane@mpg.gov.za		

Department:	Mpumalanga Tourism and Parks Authority		
Contact person:	Balungile Bhengu		
Postal address:	Private Bag X 11338 , Nelspruit		
Postal code:	1200	**Cell:**	
Telephone:	(0)13 759 5300/	**Fax:**	
E-mail:	balungile@telkomsa.net		

Department:	Department of Water Affairs		
Contact person:	Ms M Matiso		
Postal address:	Private Bag X11259, NELSPRUIT		
Postal code:	1200	**Cell:**	0835851155
Telephone:	(013) 759 7330	**Fax:**	(013) 759 7525
E-mail:	MatisoM@dwa.gov.za		

Department:	Elias Motsoaledi Municipality		
Contact person:	S. Makua		
Postal address:	P.O. Box 48, Groblersdal		
Postal code:	0470	**Cell:**	
Telephone:	0132623056	**Fax:**	013-262 2547
E-mail:	smakua@emlm.gov.za		

Department:	Thembisile Hani Local Municipality		
Contact person:	Nkosi H		
Postal address:	Private Bag X4041, MPUMALANGA		
Postal code:	0458	**Cell:**	
Telephone:	(013) 986 9186	**Fax:**	+ 27 13 986 0995
E-mail:	nkosih@thembisilehanilm.gov.za		

Department:	Nkangala District Municipality		
Contact person:	Andrew Mahlangu		
Postal address:	P. O. Box 7255 , Witbank		
Postal code:	1035	**Cell:**	
Telephone:	0132492069	**Fax:**	
E-mail:	mahlangusa@nkangaladm.gov.za		

SECTION E: APPENDICES

The following appendices must be attached to the basic assessment report as appropriate:

Appendix A: Site plan(s)
Appendix B: Photographs
Appendix C: Facility illustration(s)
Appendix D: Specialist reports
Appendix E: Comments and responses report
Appendix F: Environmental Management Programme
Appendix G: Other Information

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1. INTRODUCTION

NuLeaf Planning and Environmental (Pty) Ltd was appointed by Paul Mojapelo to undertake the required actions and assessments to apply for Environmental Authorization from Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET: the decision making authority) for the proposed expansion of the existing Bhundu Inn Hotel.

The upgrades include the expansion of the hotel from 50 rooms to 250 rooms (sleeping a total of 500 guests) as a first phase, with phase 2 of the development consisting of the construction of 10 chalets (each sleeping 4 guests). Conferencing facilities for up to 600 guests will also be provided along with standard hotel amenities such as a restaurant and swimming pool, and all required civil and service infrastructures (parking, electricity, water, sewerage, storm water etc.) will be upgraded. Refer to the Locality and Layout Maps (Appendix A.1 and A.2.1)

2. DESCRIPTION OF THE RECEIVING ENVIRONMENT

2.1. Local Authorities

Bhundu Inn Hotel falls within the jurisdiction of the Thembisile Hani Local Municipality and the Nkangala District Municipality.

2.2. Description, conditions of title and size of the property

Portion 174 of the Farm Goederede 60 JS is owned by Paul Mojapelo in his private capacity. The land was purchased in August of 1999. The total size of the property is 27, 85 hectares.

The Bhundu Inn Hotel is currently comprised of 50 rooms/100 beds.

There are no restrictive conditions registered against the property that would prohibit the expansion of the Bhundu Inn Hotel. Refer to the Locality and Layout Maps (Appendix A.1 and A.2.1)

2.3. Built Infrastructure

The built infrastructure that currently exists on the property consists of:

- The existing Bhundu Inn Hotel rooms, pool and infrastructure, which is located to the north of the property (refer to site photographs included as Appendix B).
- An Eskom power line and servitude runs from the south-western corner of the site through to the north-eastern corner of the site.
- Other infrastructure that is in ruins, including an old water tower and demolished hard surface structures located to the north west of the site.

Refer also to the site photographs in Appendix B.

2.4. Climate

Annual rainfall ranges between 639 mm and falls mainly during the summer months, often through thundershowers (Middleton & Bailey 2008).

The mean annual temperature is approximately 18°C and incidents of frost are on average ± 14 days per annum, while winters are dry. (*Watercourse Investigation for the Proposed Bhundu Inn Hotel and Conference Centre on Portion 174 of the Farm Goederede 60 JS, Mpumalanga Province,* 2014. Appendix D.5)

2.5. Geology and Hydrogeology

Paul and Partners appointed Geo - Logic Hydrogeological Consultants CC to do a Hydrogeological Investigation and Contamination Risk Assessment study for the site.

The proposed development is located in quaternary sub-catchment B32G.

The proposed development site is situated on the Nebo Granite of the Lebowa Granite Suite. The Nebo Granite is in this case part of the youngest rocks of very old rocks of Ventersdorp age.

The well / spring located on site is artesian and over-flows into a wetland area. The well is a constructed pit that is 1.1 m in diameter and 2.6 m deep. Overflow pipes are installed that empty into the adjacent wetland.

No other boreholes could be found in the area within a 1 km radius from the proposed development site. No boreholes could be found in the western part of the Bhundu settlement that is located across the Moses River. An assumption can therefore be made than no existing groundwater users are located close by which can be influenced by water abstraction on Portion 174 of the farm Goederede. (*Hydrogeological - and contamination risk assessment study for Portion 174 of the Farm Goederede 60 JS also called Bhundu Inn,* 2014. Appendix D.6).

2.6. Water courses

NuLeaf Environmental and Planning appointed Imperata Consulting to conduct a watercourse specialist investigation for the proposed Bhundu Inn Hotel and Conference Centre on portion 174 of the farm Goederede 60 JS. The investigation made use of an interdisciplinary approach to incorporate a wide variety of available watercourse indicators and features during the dry season survey.

Five (5) natural watercourses were identified and found onsite- two wetland areas (seep wetland and valley bottom wetland), riparian habitat and two ephemeral drainage lines. Refer to Watercourse Map (Appendix A.4.1)

The seep wetland forms part of a wetland system that is mainly located north of the study area and drains into the Moses River. The area has already been impacted upon due to the presence of a swimming pool, a dam and overgrazing. For these reasons the Present Ecological State (PES) of the seep wetland is regarded as 'Moderately modified' (class C). It should be noted though, that seep wetland approaching a 'Largely modified' (class D) PES due to threats such as, increased water abstraction, continued high grazing pressure, and further alien encroachment.

Soil erodibility is a concern due to the presence of Sterkspruit soils that are widespread within the seep wetland. Sterkspruit soil forms commonly have an above average concentration of sodium in the prismacutanic horizon, which increases its susceptibility to erosion.

The valley bottom wetland exists as an un-channelled valley bottom wetland at its origin outside of the study areas and naturally develops into a channelled valley bottom wetland as it drains into the study area. The channelled valley bottom wetland forms a confluence with the Moses River in the south-eastern portion of the property. This wetland remains largely intact and, as such, is classified as 'Largely Natural' (Class B).

The riparian habitat is well defined and located along the western hand bank of the Moses River within the eastern boundary of the site. It has diverse marginal and non-marginal habitats, which include rocky outcrops and portions with wetland conditions where the seepage and valley bottom wetlands drain into the Moses River. The riparian habitat is classified as 'Largely Natural' (Class B).

Ephemeral drainage line 1 is located in the south western portion of the property and only partially overlaps with the study area. This drainage line is considered a natural channel with regular or intermittent flow and contains a well-developed channel with dense stands of the invasive category 1b *Lantana camara.* The system has a 'Moderately to Largely modified' (class C/D) Present Ecological State (PES), which will improve if targeted alien control is undertaken and grazing pressure is reduced.
Ephemeral drainage line 2 is entirely located within the property in the southern portion of the site. This drainage line contains a well-developed channel with a 'Largely Natural' (class B) PES.

The Ecological Importance and Sensitivity (EIS) values of the watercourses within the study area range between High (Class B) to Low/marginal (Class D). Only the Ephemeral drainage line has a Low/marginal EIS rating, while the remaining watercourses all have a High EIS value.

The largest threat to the Present Ecological State of delineated watercourses is the continued encroachment of alien plant species, specifically the invasive category 1b species *Lantana camara*, which is already established in most of the watercourses. Further ecological deterioration is expected if no intervention is undertaken.

Another existing threat to the ecological integrity of the watercourses is the high grazing pressure by livestock within the property. (*Watercourse Investigation for the Proposed Bhundu Inn Hotel and Conference Centre on Portion 174 of the Farm Goederede 60 JS, Mpumalanga Province,* 2014. Appendix D.5)

2.7. Vegetation

Dimela Eco Consulting was tasked by NuLeaf Planning and Environmental to undertake a vegetation assessment of the development footprint and surroundings to evaluate the potential impacts on the vegetation.

The site is situated in the Savanna Biome, specific in the Central Sandy Bushveld Loskop Mountain Bushveld vegetation types. The site is not situated in a listed ecosystem in terms of Section 52 of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 32689, 2009).

As per the Mpumalanga Biodiversity Conservation Plan, the whole site is situated in an area classified as *Highly Significant*, as well as being situated within an Ecological Corridor. A limited number of land uses are supported in these areas and include: Conservation management, Extensive game farming, Extensive livestock production and possibly, Rural recreational development

4 broad groupings of vegetation were observed on site, namely, transformed land, the tamboti stand, Bushveld and vegetation associated with watercourses. Refer to Map A.3.1.

The transformed land is characterized by vegetation that no longer comprises the natural species composition and includes gardens, infrastructure and disturbed areas. A number of the national protected tree, *Sclerocarya birrea subsp. africana* (marula) was found within this area.

Spirostachys africana (tamboti tree) is protected in Mpumalanga and was recorded in a stand on the north eastern portion of the site, within the transformed vegetation.

The bushveld vegetation ranged from *bushveld on shallow soils and rocky areas* to *bushveld on deeper soils*:

- The bushveld on deeper soils would support a well-developed grass layer. This resulted in this vegetation grouping being overgrazed with a high frequency of *Dichrostachys cinerea* as well as the succulent *Aloe greatheadii*, which also tend to proliferate in overgrazed areas. The tree layer included the *Combretum* species, *Acacia burkei, Peltophorum africanum* (weeping wattle), *Grewia monticola, Pappea capensis* (jacket plum), *Searsia leptodictya* (mountain karee), *Terminalia sericea* (silver cluster leave) and *Ziziphus mucronata* (buffalo-thorn.
- The rocky bushveld comprised slightly higher species diversity and included protected plant species (*Gladiolus cf pole-evansii* and a *Bonatea* species), as well as habitat for threatened plant species.
- The trees *Olea europea subsp africana* (wild olive), as well as *Sclerocarya birrea subsp caffra* (marula) occurred sporadically in the bushveld. The wild olive is provincially protected, while marula is a national protected tree.

The vegetation located in and around the wetland was characterised by a number of hydrophytic plant species and include the sedges *Cyperus papyrus* (papyrus), *Fuirena pachyrrhiza, Schoenoplectus brachyceras* and *Fimbristylis dichotoma*. Herbaceous species included *Chironia palustris (marsh chironia), Rhanunculus multifidus* (buttercup) as well as the provincially protected *Zanthedeschia aethiopica* (arum lily).

The vegetation along the perennial Moses River varied, depending on the presence of rocks and sand. The rocky vegetation composition along the river was similar to that of the rocky bushveld. However, additional species that tend to grow along riparian areas included *Grewia monticola* (silver raisin), *Nuxia cf oppositifolia* (water elder) and *Combretum zeyheri* .The sandy banks included grasses such as *Miscanthus junceus* (wireleaf daba grass), *Hemarthria altissima* (swamp couch) as well the sedge *Juncus lomatophyllus* and the herbaceous *Sphaeranthus peduncularis subsp. peduncularis*.

The non-perennial river in the southern portion of the site was a relatively narrow stream through rocky and sandy areas and contained some water. The grass layer was grazed short by cattle and a number of alien invasive plants colonised the deteriorated vegetation. Indigenous trees and shrubs included *Heteropyxis natalensis* (lavender tree), *Combretum species, Acacia bukei, Dichrostachys cinerea, Olea europea subsp africana*

(wild olive), *Searsia lancea* (karee) and *Pelthophorum africanum* (weeping wattle). (*Bhundu Inn Vegetation Assessment*, 2014. Appendix D.1)

Refer also to Map A.3.1.

2.8. Fauna

With regards to fauna, a search was undertaken on the South African Biodiversity Information Facility (SABIF) website to determine if any Red List species were found in the area. Search criteria were used to delineate and select which data sources to use. The interactive map was then selected and the tool 'create checklist' used. A square was then drawn around QDS 2529AC, which is where the site lies. A list was then generated, that details all faunal species known to be found in that specific area. Upon investigation of the species list, it was found that, to our knowledge, no Red List species reside in the area or any species of concern. The species list can be found in Appendix D.9.1

Additionally, Mr Jannie Coetzee, from Mpumalanga Tourism and Parks Agency (MTPA) was contacted and the faunal species list and Management Plan for the adjacent SS Skosana Nature Reserve was obtained. No species of concern were noted. Refer to Appendix D.9.2

The proposed site is also not an Important Birding Area (IBA). The IBA Map was accessed from the Birdlife South Africa website, and the site, as well as SS Skosana are not classified as IBA's.

2.9. Land use

The Bhundu Inn property is currently used as a hotel / tourism facility which consists of a 50 room hotel with staff accommodation and other amenities (such as a swimming pool) and related infrastructure.

Areas bordering the Hotel are largely undeveloped and used as grazing land for livestock, while dryland cultivation is present on the opposite side of the river. The SS Skosana Nature Reserve is a formally protected provincial nature reserve, which borders the site to the north west.

Settlements adjacent to the site consist of Bhundu, Matshipe and Boekenhouthoek. These settlements lie to the south east, north east and south west of the site respectively, falling within the Thembisile Hani Local Municipality, in the Nkangala District of the Mpumalanga Province.

Refer to the Locality and Layout Maps (Appendix A.1 and A.2.1).

2.10. Cultural Heritage

Francois P. Coetzee, an independent Cultural Heritage Consultant, was commissioned by NuLeaf Planning and Environmental to undertake a cultural heritage assessment of Portion 174 of the Farm Goederede 60 JS in order to determine the heritage potential and the impact on possible heritage resources.

No archaeological (both Stone Age and Iron Age) and historical structures, features assemblages or artefacts were recorded during the survey. No grave or graveyards were recorded during the survey. (*Cultural Heritage Assessment for the Proposed Expansion*

of the Bhundu Inn Hotel, Portion 174 of the Farm Goederede 60 JS, Thembisile Hani Local Municipality, Nkangala District, Mpumalanga, 2014. Appendix D.4)

2.11. Palaeontology

Professor Marion Bamford, an independent Consultant, was commissioned by NuLeaf Planning and Environmental Pty (Ltd) to assess the paleontological significance of Potion 174 of the Farm Goederede 60 JS.

The site of the hotel is on ancient Proterozoic rocks, specifically the Lebowa Granite Suite, comprising a number of types of granites, which have been metamorphosed and are part of the Bushveld Complex. (*Paleontological Impact Assessment for the proposed Hotel (Bhundu Inn) upgrade adjacent to the SS Skosana Nature Reserve, Mpumalanga,* 2014. Appendix D. 2)

2.12. Visual Environment

The Visual Impact Assessment was undertaken by NuLeaf Planning and Environmental, using Geographic Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed expansion of the Bhundu Inn Hotel on Portion 174 of the Farm Goederede 60 JS, Mpumalanga.

The topography of the study area is characterised as undulating to flat plains, consisting of low mountains and hills. Elevation ranges from 1000 m above sea level (a.s.l.) in the north and north east to 1450 m a.s.l. in the south, south west, west and north west. Prominent hills are located west and north west of the site, with the Moses River representing the lowest lying area along the southern boundary.

The visual quality of the region is generally high. Large tracts of intact bushland characterise most of the visual environment, and the settlements and towns, where these occur, are quaint and neat. There is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale. The adjacent SS Skosana Nature Reserve also contributes significantly to the high quality of the visual environment and sense of place within the region.

The visual quality of the site is also high overall, with noteworthy visual features such as the Moses River, the grove of tambotie trees adjacent to the wetland and the rocky outcrop in the centre of the site.

Refer to the Visibility Maps located in the VIA in Appendix D.3.

3. DESCRIPTION OF THE PROPOSED ACTIVITY

3.1. Project

The upgrades include the expansion of the hotel from 50 rooms to 250 rooms (sleeping a total of 500 guests) as a first phase, with phase 2 of the development consisting of the construction of 10 chalets (each sleeping 4 guests). Conferencing facilities for up to 600 guests will also be provided along with standard hotel amenities such as a restaurant and swimming pool, and all required civil and service infrastructures (parking, electricity, water, sewerage, storm water etc.) will be upgraded.

Access will be via existing roads, though internal gravel roads and parking and service areas will be constructed.

The total development footprint/cleared area is anticipated to be less than 20 Hectares.

Refer to the Map A.2.1 and the Facility Illustration in Appendix C.

3.2. Locality

The proposed location of the Bhundu Inn Hotel is to be located at 25°17.905'S; 29°3.276'E.

Map A.1 illustrates the locality of the Hotel and the site photographs (Appendix B) document the surrounding area, as well as, a 360 viewpoint of the site.

3.3. Roads

Access already exists to the site via the Moteti and Bhundu Roads. These roads are unpaved and are in fairly good condition.

New internal roads and parking areas will need to be constructed in order to provide access to the hotel units. These roads will be gravel as far possible with additives to reduce dust. Parking may be covered with permeable paving or grass blocks.

3.4. Storm water

The site has a general slope from the west to the east, towards the Moses River. A wetland area is present east of the development, which also drains into the Moses River.

The entrance road is proposed to follow the existing gravel road from the north, with parking area and arrivals area at the main building. An access road along the north western and western boundaries of the property will be constructed for the chalets. This road will form a cut off drain from sheet flow originating in the hills of the SS Skosana Nature Reserve. This runoff will be redirected around the development with an open channel next to the road with culverts allowing water to drain underneath the road at low points.

Within the development small culverts will be used between the buildings in order to protect the buildings from flooding. These will also be diverted around the building and dissipated before surface discharging into natural and landscaped areas. All the surface water will eventually enter the Moses River.

Refer to the map contained in Annexure D of the Service report (Appendix D.7).

Storm water runoff will increase by approximately 4% from the predevelopment conditions to the post development conditions. This small increase should not have an effect on the natural watercourses in the area. Any discharge from storm water systems will be designed to eliminate erosion, in order to achieve this, several attenuation ponds throughout the development will be constructed. This will allow water to discharge at a low rate. These areas will also stimulate ecological diversity as new reed beds and ponds will form. (*Bhundu Inn Hotel Development Services Report*, 2014. Appendix D.7).

3.5. Water

No municipal water connections are available for the property. Currently an existing spring / borehole is in use for the current hotel's water supply. The fluoride level for the water from the well is above the standard limits, which means that this water must be treated by a Reverse Osmosis process prior to human consumption.

The bacteriological count for the water well shows that the water does not need to be treated prior to human consumption. No filtration or chlorination is needed to treat the water for bacteria prior to human consumption. The well should be sealed with a lockable lid in order to protect the water from outside contamination.

The total daily water demand is estimated to be 123 000 litres.

A fire water supply capacity of 144,000 litres is required; this will be required to be filled from the borehole once and will not have affect daily water demand.

Water will be stored in a sectional steel tank filled with the water from the well. The capacity of the storage tank for both domestic and fire water requirements is 300 000 litres.

Water supply will be by means of a booster pump set from the cold water storage tank and large diameter piping to each of the wings and a ring main around the main building. (*Bhundu Inn Hotel Development Services Report*, 2014. Appendix D.7)

3.6. Sanitation

The property is currently served by a septic and soak away system as no municipal sewer connection is available. This system will be completely replaced by a new system.

The daily sewage flow for the proposed development is estimated at 140 litres per bed / day, totalling 70 500 litres per day based on a maximum of 500 beds. Taking the above into consideration, the total daily sewage flow is estimated at 81 000 litres.

Treatment works for the sewage consists of 5 centralised separate septic tanks (one for the main building, one for each hotel room wing and one for the chalets). The main building will be serviced by a central waste water treatment package plant (effluent only), located to the east of the development, 127 meters away from the nearest drainage line (the recommended buffer is 100 m, and therefore the risk to drainage features is minimal). Sludge accumulation will take place within the septic tanks before effluent treatment, as the maintenance on such a system will be periodical rather than daily. Sludge will be collected by a specialized service provider and properly disposed of at proper waste treatment sites.

Properly treated effluent emanating from the waste water treatment package plant will be collected in a lined irrigation dam and supply irrigation water to areas landscaped around the development.

Effluent emanating from the septic tank at the chalets will be dissipated via a soak away by means of properly designed and installed soak away systems.

Refer to the map contained in Annexure D of the Service report (Appendix D.7).

All sewage within the development will be drained via a gravity system through a network of uPVC pipes and manholes (*Bhundu Inn Hotel Development Services Report*, 2014. Appendix D.7)

3.7. Solid waste

A typical hotel room generates between 1 to 10kg of solid waste per person per day. Using a conservative estimate of an average of 5kg per room per day, the expected solid waste generate at 100% occupancy is 1.45 tons. This equates to 530 tons per annum.

The more likely scenario will be an average occupancy rate of 60% during the year; therefore solid waste generation should be only 320 tons per annum. This is an average of 1.5kg per room per day.

Space has been made available in the service yard and back of house areas of the main building to facilitate the temporary storage of solid waste generated by the development. This space will be adequate to allow for the sorting of material in order to recycle as much of the solid waste as possible.

The Contractor will co-ordinate the collection and sorting on site of all recyclable materials (organic, glass, metal, plastic, paper, wood), inert rubble (uncontaminated soil, rock, concrete and building rubble), potentially harmful waste (oils, solvents and other chemicals) and non-recyclable general waste.

Non-recyclable solid waste will be disposed of by a specialist waste management service provider at least once per week but more often as required. All material that can be recycled will be placed in clearly marked containers. These materials must be handled and stored in such a way that it is acceptable to the recycler. This 'sorting at source' method will remove the need for double handling.

Solid waste will be disposed of at the nearest licensed land fill site. Negotiations to receive this waste will be entered into with the local municipality at the appropriate time. (*Bhundu Inn Hotel Development Services Report*, 2014. Appendix D.7)

3.8. Electricity

The projected electrical demand for the facility is 1200 kVA, which will be supplied via the Eskom line traversing the site. Of this, 450 kVA will be on standby electricity supply by means of diesel generators. Negotiations with Eskom to provide electricity will be entered into at the appropriate time.

The different hotel room wings, as well as separate clusters of hotel rooms within each wing will allow the operator to switch off electricity to clusters not occupied or even entire wings not occupied. Whenever a wing is not occupied the electricity supply to the wing can be switched off including the hot water generation plant.

Electrical distribution lines will be installed underground. The routes will be similar to other services in order to minimize the impact on the environment. (*Bhundu Inn Hotel Development Services Report*, 2014. Appendix D.7).

3.9. Hot water

Hot water storage will be done for each of the bedroom wings separately and separately for the main building.

The required hot water storage and supply for the Bhundu Inn hotel, consisting of the main building, 3 wings and the 10 chalets will be approximately 34 500 litres/ per day.

The proposed system to be used for hot water generation is heat pump installations. Heat pumps use approximately a third of the amount of electricity to heat the same amount of water as a conventional electrical system would use and they can heat water during the night. Water is also not overheated and, therefore, safety valves are not required and water is not lost in an effort to relieve pressure build up.

It is proposed that the most economical way of storing and supplying hot water is a central hot water storage tank for the main building and for each hotel room wing.

Storage tanks will be floor standing, mounted on plinths of at least 100 mm and insulated with insulation material of at least 100 mm thick. Storage tanks' shells will be of galvanised metal suitable for a test pressure of 1000 kPa and a maximum working temperature of 100°C. Galvanising shall be inside and outside.

Each chalet accommodating 4 beds will be supplied by one heat pump installation with a 200 litre storage capacity (Four beds at 50 litre each).

3.10. Building efficiency

Measures that have been considered and incorporated into the design of the building to increase efficiency include the following:

- Room windows will be equipped with special glass, which complies with SANS 204. Proposed external shading will reduce radiation into rooms through windows, in order to maintain constant temperatures in the rooms during sunlight hours.
- Air-conditioning units will be manufactured from expanded polypropylene, which has excellent energy absorption and high strength properties. It will offer very good absorption of noise and vibration.
- High Efficiency indoor and outdoor fans will be used, reducing the input consumption and increasing the Energy Efficiency Ratio and Coefficient of Performance levels.
- An environmentally friendly refrigerant R410A will be used with a high efficiency compressor.
- All buildings will have proper insulation complying with SANS 204 and 10400.
- Dual flush toilets, low flow rate taps with aerators and only showers will be used within the bathrooms of hotel rooms and public toilets to minimize water usage.
- A large percentage of the cooking equipment will use Liquefied Petroleum Gas in order to reduce the electricity requirements.
- The rooms and public areas will be fitted with Light Emitting Diode (LED) light fittings to reduce the electricity demand.

4. APPLICABLE LEGISLATION

4.1. The National Environmental Management Act (NEMA)

The proposed activity triggers activities as listed in GN Regulations 544 and 546 of 18 June 2010 issued in terms of sections 24(2) and 24D of the National Environmental Management Act (NEMA, Act 107 of 1998).

The relevant activities include the following:

Government Notice R544 Activity No.	Describe the relevant Basic Assessment Activity (ies) in writing as per Listing Notice 1 (GN No. R544)	Describe the portion of the development as per the project description that relates to the applicable listed activity
9 (i) (ii)	The construction of facilities or infrastructure exceeding 1000 meters in length for the bulk transportation of water, sewage or storm water with an internal diameter of 0,36 meters or more; or with a peak throughput of 120 litres per second or more.	The construction of service infrastructure and civils (specifically storm water) in support of the proposed hotel expansion may exceed the listed threshold.
11 (vi) (x)	The construction of bulk storm water outlet structures and buildings exceeding 50 square meters in size where such construction occurs within a watercourse or within 32 meters of a watercourse.	The construction of structures, infrastructure, services and civils (specifically storm water) in support of the proposed hotel expansion may exceed the listed threshold.
23 (ii)	The transformation of undeveloped, vacant or derelict land to residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.	Construction of buildings, structures, infrastructure, services and civils in support of the proposed hotel expansion is likely to have a footprint of below 20 Ha.
37 (a) (b)	The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: the facility or infrastructure is expanded by more than 1000 meters in length; or where the throughput capacity of the facility or infrastructure will be increased by 10% or more.	Depending on the final development plans, the service and civil infrastructure required in support of the proposed hotel expansion may constitute new infrastructure and / or an expansion of existing infrastructure on site. This infrastructure may exceed the listed threshold.
39 (v)	The expansion of bulk storm water outlet structures within a watercourse or within 32 meters of a watercourse.	Depending on the final development plans, the service and civil infrastructure (specifically storm water) required in support of the proposed hotel expansion may constitute new infrastructure and / or an expansion of existing infrastructure on site. This infrastructure may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site.
40 (iii)	The expansion of buildings by more than 50 square meters within a watercourse or	Depending on the final development plans, components of the proposed hotel

	within 32 meters of a watercourse.	expansion exceeding 50 square meters may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site.
Government Notice R546 Activity No:	**Describe the relevant Scoping and EIA Activity (ies) in writing as per Listing Notice 3 (GN No. R546)**	**Describe the portion of the development as per the project description that relates to the applicable listed activity**
4 (a) (ii) (cc); (ee) & (gg)	The construction of a road wider than 4 meters with a reserve of less than 13, 5 meters outside urban areas in: • sensitive areas as identified in an environmental management framework,; • critical biodiversity areas as identified in biodiversity/ bioregional plans and • areas within 5 kilometres from any protected area identified in terms of NEMPAA.	The proposed expansion of the hotel will include the construction /or new roads and / or the extension of existing roads for access and circulation, which may exceed the listed threshold. The site is located on the border of SS Skosana Nature Reserve and within 5 km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true.
6 (a) (ii) (cc); (ee); (gg) & (ii)	The construction of resorts, lodges or other tourism accommodation facilities that sleep 15 people or more, outside urban areas in: • sensitive areas as identified in an environmental management framework, • critical biodiversity areas as identified in biodiversity/ bioregional plans, • areas within 5 kilometers from any protected area identified in terms of NEMPAA and • areas on the watercourse side of the development setback line or within 100 meters from the edge of a watercourse where no such setback line has been determined.	Depending on the final development plans, the proposed hotel expansion may constitute the construction of new infrastructure and / or an expansion of existing infrastructure on site. The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true. Depending on the final development plans, components of the proposed hotel expansion exceeding 50 square meters may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site.

12 (b)	The clearance of an area of 300 square meters or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, within critical biodiversity areas identified in bioregional plans.	The total development footprint will be just under 20 hectares in size. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true.
13 (a) (c) (ii) (cc) & (ff)	The clearance of an area of 1 hectare or more of vegetation outside urban areas where 75% or more of the vegetative cover constitutes indigenous vegetation in; • sensitive areas as identified in an environmental management plan and • areas within 5 kilometers from any protected area identified in terms of NEMPAA	The total development footprint will be just under 20 hectares in size and it is anticipated that 75% or more of the vegetation will be indigenous (Central sandy Bushveld). The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant.
14 (a) (i)	The clearance of an area of 5 hectares or more of vegetation outside urban areas where 75% or more of the vegetative cover constitutes indigenous vegetation.	The total development footprint will be just under 20 hectares in size and it is anticipated that 75% or more of the vegetation will be indigenous (Central sandy Bushveld).
16 (a) (ii) (dd); (ff) & (hh)	The construction of buildings with a footprint exceeding 10 square meters in size, or infrastructure covering 10 square meters or more; outside urban areas and where such construction occurs within a watercourse or within 32 meters of a watercourse in: • sensitive areas as identified in an environmental management framework, • critical biodiversity areas or ecosystem service areas as identified in biodiversity/ bioregional plans and • areas within 5 kilometers from any protected area identified in terms of NEMPAA.	Depending on the final development plans, components of the proposed hotel expansion may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site. The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true.
18 (a) (ii) (cc); (ee) & (gg)	The expansion of a resort, lodge, hotel and tourism or hospitality facilities where the development footprint will be expanded outside urban areas in:	Depending on the final development plans, the proposed hotel expansion may constitute the construction of new infrastructure and / or an expansion of

	• sensitive areas as identified in an environmental management framework, • critical biodiversity areas as identified in biodiversity/ bioregional plans and areas within 5 kilometers from any protected area identified in terms of NEMPAA.	existing infrastructure on site. The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true.
19 (a) (ii) (cc); (ee); (gg) & (ii)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometre outside urban areas in: • sensitive areas as identified in an environmental management framework, • critical biodiversity areas as identified in biodiversity/ bioregional plans, • areas within 5 kilometers from any protected area identified in terms of NEMPAA and • areas on the watercourse side of the development setback line or within 100 meters from the edge of a watercourse where no such setback line has been determined.	The proposed expansion of the hotel will include the construction /or new roads and / or the extension of existing roads for access and circulation, which may exceed the listed threshold. The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true. Depending on the final development plans, access and circulation roads may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site.
24 (c) (ii) (cc); (ee) & (gg)	The expansion of buildings by 10 square meters or more outside urban areas where such construction occurs within a watercourse or within 32 meters of a watercourse in: • sensitive areas as identified in an environmental management framework, • critical biodiversity areas as identified in biodiversity/ bioregional plans and areas within 5 kilometers from any protected area identified in terms of NEMPAA	Depending on the final development plans, the proposed hotel expansion may constitute the construction of new buildings and / or an expansion of existing buildings on site. The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant.

		No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true. Depending on the final development plans, components of the proposed hotel expansion may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site.
24 (d) (ii) (cc); (ee) & (gg)	The expansion of infrastructure by 10 square meters or more outside urban areas where such construction occurs within a watercourse or within 32 meters of a watercourse in: • sensitive areas as identified in an environmental management framework, • critical biodiversity areas as identified in biodiversity/ bioregional plans and areas within 5 kilometers from any protected area identified in terms of NEMPAA	Depending on the final development plans, the proposed hotel expansion may constitute the construction of new infrastructure and / or an expansion of existing infrastructure on site. The site is located on the border of SS Skosana Nature Reserve and within 5km of the Mabusa Nature Reserve (both protected areas as defined by NEMPAA) and the greater area has been identified on the Mpumalanga C-Plan as Highly Significant. No data is currently available for the region regarding its critical biodiversity status, and thus has been included in the event that upon the completion of biodiversity and/ or vegetation studies, it is found to be true. Depending on the final development plans, components of the proposed hotel expansion may be located in proximity to the perennial stream, non-perennial drainage lines or the wetland located on site.

4.2. Additional legislation

The following legislation may also be applicable:

- **Constitution of Republic of South Africa (108 of 1996):** This is the fundamental law of South Africa, setting out the Bill of Rights, as well as, the relationship of various government structures to each other.
- **Conservation of Agricultural Resources (Act 43 of 1983):** Provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
- **National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004):** The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework set out by NEMA

and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

- **National Spatial Biodiversity Assessment:** The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.
- **National Forests Act, 1998 (Act no 84 of 1998):** This Act provides for the management, utilisation and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree species, as indicated in a list of protected trees (first promulgated in 1976 and updated since). Permits are administered by the Department of Agriculture, Forestry and Fisheries (DAFF).
- **National Heritage Resources Act 25 of 1999:** The National Heritage Resources Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including pipelines) exceed 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).
- **National Veld and Forest Fire Act, 1998 (Act No. 1010 of 1998):** This Act provides for the management, utilisation and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree species, as indicated in a list of protected trees (first promulgated in 1976 and updated since). Permits are administered by the Department of Agriculture, Forestry and Fisheries (DAFF).
- **National Water Act 108 of 1997:** The National Water Act, 1998 (Act No. 36 of 1998) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.
- **National Environmental Management Waste Act 59 of 2008:** The Waste Act reforms the law regulating waste management in order to protect environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.
- **Occupational Health and Safety Act, 1993 (Act No. 85 of 1993):**The purpose of this Act is to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with, the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

4.3. Alignment with the Nkangala District Municipality Integrated Development Plan

One of Thembisile Hani strategic objectives is to promote local economic development and growth through the identification and facilitation of economic opportunities, tourism and mining. This falls in line with the Nkangala District Municipality objective, whereby, local economic development will be achieved via Tourism Development and Branding Strategy.

On a whole, all of the local municipalities within Nkangala District have high tourism development potential. Unfortunately, this potential is being underutilized.

In order to combat this, the Nkangala District Municipality has developed a tourism strategy, which focuses on the identification, assessment and development of priority tourism clusters, key journey components in the NDM and a 2010 Action Plan.

One of the potential clusters that have been identified in order to improve the tourism spread within the Municipality is the Eco-Nature cluster, which involves enhancing Nature Reserves and surroundings, found in Dr. JS Moroka and Thembisile Local Municipalities.

The Loskop-Zithabiseni Tourism Belt Development has also been identified as a Local Economic Development anchor project. Various Nature Reserves in the north west of the District carry enormous potential for further tourism development (Mdala, Mkhombo, SS Skosana, Mabusa, Loskop nature reserves, etc.). The close proximity to Gauteng as the main market or entry point for tourists must be seen as a strong advantage and calls for action. The main focus of the development proposal centres on the establishment of an integrated ecotourism concept.

The existing game reserves and tourism facilities are currently under-utilized and under-developed. Through upgrading the reserves and associated infrastructure, revitalization and expansion of tourism facilities, enhanced economic development with regional significance and relevance, especially for the historically disadvantaged areas of the former homelands, can be achieved. The identification of the Loskop-Zithabiseni Tourism Belt Development as an anchor project is the first step that the District in collaboration with the MTPA seeks to undertake in unlocking the tourism development potential of the area, within the broad tourism belt.

4.4. Alignment with Nkangala Spatial Development Framework

The Nkangala Spatial Development Framework has been aligned to, and taken into account the principles, of the National Spatial Development Programme.
The Spatial Development Objectives include the following:

- To capitalise on the strategic location and linkages within regional and provincial context;
- To establish a hierarchy of service centres to ensure equitable access to social infrastructure and development of economic activities throughout the area;
- To utilise the nature reserves in the municipal area to promote eco-tourism and to identify and develop the local cultural historic heritage;
- To consolidate economic activities along the major corridors/around the major nodes in the District, with specific focus on the N4, N12 and Moloto Corridors as well as the Emalahleni-Kriel-Secunda mining-manufacturing spine and the

Grobblersdal-Middelburg-Hendrina-Ermelo mining/extensive agriculture development spine;

- To actively manage the natural environment in order to ensure a sustainable equilibrium between the mining, agriculture and tourism industries in the District;
- To ensure protection of natural resources (i.e. water, land and air) from degradation and pollution (i.e. protection of water catchment areas, control of settlement encroachment on watersheds etc.(i.e. through buffer zones, environmental impact assessment etc.);
- To enhance Biodiversity conservation through environmentally sustainable development.

With the above objectives in mind, the N4 Maputo Corridor, N12 Corridor, and the Moloto Corridor hold significant opportunities for the Nkangala District area, both in terms of economic spin-offs from the corridor and tourism potential. Activities capitalising on the economic opportunities associated with these corridors should be encouraged to locate adjacent to the corridors. This could include intensive agriculture, agro-processing and hospitality uses.

In order to address the issues of poverty and unemployment affecting Thembisile Hani and Dr JS Moroka, tourism opportunities within these regions need to be promoted. One way to do this is to consolidate the nature reserves and exploit the tourism opportunities.

The development of a Tourism Belt and Focus Area (Loskop / Mabusa / Skosana / Mkhombo / Dinokeng) in the District is in the early stages. The hope is that this belt will promote and enhance the tourism potential within the area, focus investments and incentives, and benefit poor communities.

5. PUBLIC PARTICIPATION

5.1. Interested and Affected Parties

The Republic of South Africa's constitution states that everybody has the right to be informed and to have access to information. An important aspect of conducting environmental assessments is to provide avenues for interested and affected parties to gain information and provide input and comments on all proposed developments.

In order to meet the above requirements, interested and affected parties were identified and contacted directly via written notification and the provision of a Background Information Document. Site notices were placed at the proposed site and in and around the area and an advertisement was placed in the Sowetan Newspaper inviting any Interested and Affected partied to register for the process.

All the relevant authorities, as well as, potential interested and affected parties were contacted and notified by E-mail of the proposed expansion on 5 September 2014. Proof of this notification is included in Appendix E.

5.2. Authorities

Compliance Authorities and other organizations were directly notified of the proposed expansion by email and provision of a Background Information Document:

- Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET)

- The South African Heritage Resources Agency (SAHRA)
- Mpumalanga Tourism and Parks Authority (MTPA)
- Thembisile Hani Local Municipality
- Elias Motsoaledi Local Municipality
- Nkangala District Municipality
- Department of Water Affairs (DWA)
- Wildlife and Environment Society (WESSA)
- SS Skosana Nature Reserve

All the relevant authorities, as well as, potential interested and affected parties were contacted and notified by E-mail of the proposed expansion on 5 September 2014. Proof of this notification is included in Appendix E.

5.4. Notices

Site notices were placed at the following locations on 5 September 2014:

- The front gate of Bhundu Inn Hotel
- The front gate of SS Skosana Nature Reserve
- Moteti Constituency Office

Photographs of these notices have been included in Appendix E.

5.5. Newspaper advert

An advertisement was placed under legal notices of the Sowetan Newspaper on 5 September 2014. A copy of this advertisement has been included in Appendix E.

5.6. Background Information Document

Identified Interested and Affected Parties, Authorities and Compliance Organisations were provided with a Background Information Document (BID) to provide initial information about the proposed project, site and process. A copy of this BID has been included in Appendix E.

5.7. Summary of Comments and Response

A summary of all Comments received during the Registration period, as well as, comments on the Draft BAR has been included in Appendix E. The response by the EAP has been included as well.

Please note that as this is a draft, no comments have yet been received.

6. NEED AND DESIRABILITY OF THE PROJECT

6.1. Desirability

Portion 174 of the Farm Goederede 60 JS is located in Thembisile Hani Local Municipality within the Nkangala District. It is bordered to the north west by SS Skosana Nature Reserve and Mabusa Nature Reserve is located south east of the property, less than 5 km away.

Tourism amenities within the area are limited. SS Skosana NR offers a self-catering option - C.N. Mahlangu Lodge - which can house guests in 16 two-bed *rondavels*. Mabusa NR offers the Zithabiseni Holiday Resort, although it is currently in a state of disrepair.

The area of Thembisile Hani Local Municipality is characterised by a large rural component and high unemployment. According to Stats SA 2011, the unemployment rate is currently standing at 37% (Thembisile Hani IDP 2014/2015).

The expansion of the Bhundu Inn Hotel will, therefore, fulfil both a need for accommodation and tourism development within an area of natural beauty and conservation and use, as well as job creation within the area.

Employment opportunities will exist during the construction and operational phase. A fair number of jobs will be semi to low-skilled in nature and will be made available to members of the local communities, such as, Bhundu and Boekenhouthoek.

6.2. Need

There are limited accommodation and conferencing facilities developed within the greater region, specifically in Themibisile Hani Local Municipality. The Zithabiseni Holiday Resort is the closest facility, located within Mabusa Nature Reserve, but in a neglected state. This lack of suitable accommodation is a contributing factor to the current underutilization of tourism opportunities in the Municipality.

It is important that the natural environment and recreational potential of the Municipality is developed and utilized so that all members, particularly the poor, can benefit. Bhundu Inn Hotel is situated in a prime position, between two Provincial Nature Reserves (NR's), namely the SS Skosana NR and Mabusa NR. These Nature Reserves are within easy driving distance from Gauteng and are also popular birding destinations. Due to the fact that the Nature Reserves themselves can only house a small number of guests the need to develop a greater variety of tourist accommodation has been identified within the region. This will become particularly important once the development of the Tourism Belt is complete.

The proposed expansion of Bhundu Inn Hotel will aid in unlocking the tourism potential of the region. While the Bhundu Inn Hotel has been in existence for some time, it has not been operational of late. By expanding the hotel, more jobs and training opportunities will be created during both the construction and operational phases. There is, therefore, a need to expand the Hotel in order to generate income, jobs and growth within the area.

6 ALTERNATIVES

Layout and technology alternatives, including the No-Development option were considered for the proposed expansion of the Bhundu Inn Hotel. Site and process alternatives were not considered.

6.1. Alternative 1 (Preferred Alternative)

Layout

The main building/ services are located in the North West quadrant whereby the marula trees will be conserved and incorporated into open space planning. The Hotel units will be

housed in 3 ‘arms’ or wings that extend from the main building in a south westerly and north easterly direction.

Refer to Maps A.2.1, A.3.1, A.4.1 and A.5.1.

The majority of the Bhundu Inn hotel will be located on transformed land, though a small portion of one wing does extend into areas of low or medium ecological sensitivity and encroaches marginally into the buffer zone of the rocky outcrop where the Gladiolus habitat exists. This cannot be avoided due to the fact that no other layout can accommodate all site features within low sensitivity areas.

A small portion (less than 30%) of the tamboti trees will have to be removed in order to accommodate the wing extending to the north east. All relevant permits from the MTPA will be obtained before any protected trees will be removed.

The buildings and internal access roads all lie outside of the indicated buffer zones for the wetland, the Moses River and 2 drainage lines located on the site.

Future expansion of the Bhundu Inn Hotel (phase 2) will be located in southern portion of the land in areas that have a medium ecological sensitivity. All recommended buffer zones will be respected for this phase and no development will occur in these areas.

Of note is that this layout was developed subsequent to the alternative layout, and in response to specialist studies undertaken on the site.

Hot water supply

The required hot water storage and supply for the Bhundu Inn hotel, consisting of the main building, 3 wings and the 10 chalets will be approximately 34 500 litres/ per day.

The proposed system to be used for hot water generation is heat pump installations. Heat pumps use approximately a third of the amount of electricity to heat the same amount of water as a conventional electrical system would use and they can heat water during the night. Water is also not overheated and, therefore, safety valves are not required and water is not lost in an effort to relieve pressure build up.

Sanitation

The daily sewage flow for the proposed development is anticipated to be 81 000 litres.

Treatment works for the sewage has been investigated and the preferred option consists of 5 centralised separate septic tanks (one for the main building, one for each hotel room wing and one for the chalets) with a central waste water treatment package plant.

The waste water treatment package plant will located to the east of the development, 127 meters away from the nearest drainage line (the recommended buffer is 100 m, and therefore the risk to drainage features is minimal). This plant will receive effluent from the main building and hotel room wings (phase 1). Sludge accumulation will take place within the septic tanks before effluent treatment, as the maintenance on such a system will be periodical rather than daily. Sludge will be collected by a specialized service provider and properly disposed of at proper waste treatment sites.

Properly treated effluent emanating from the waste water treatment package plant will be collected in a lined irrigation dam and supply irrigation water to areas landscaped around the development.

Effluent emanating from the septic tank at the chalets will be dissipated by means of properly designed and installed soak away systems.

6.2. Alternative 2 (Layout Alternative)

Layout

In this Layout Alternative (Alternative 2) the main building/ services of the Bhundu Inn Hotel are located in the area where the tamboti stand exists. The tamboti tree is a Protected tree in Mpumalanga province and, therefore, permits and authorization will be required for the removal of these trees. In addition, the access road traverses both the wetland area and the Moses River buffer area.

Refer to Maps A.2.2, A.3.2, A.4.2 and A.5.2.

The units of the Hotel are housed in four (4) 'arms' or wings that fan out in an arc and extend towards the west and south west. The majority of the wings are located on previously disturbed or transformed land, though one wing does extend into areas where the vegetation is classified as medium to medium-high sensitivity.

The internal access gravel roads, while following a scenic route, transverse through areas of medium- high to high sensitivity. The roads will also encroach into the 32 meter and 50 meter buffer zones for the Wetland and Riparian habitat respectively.

Future expansion of the Bhundu Inn Hotel (phase 2) will be located in southern portion of the land in areas which have a medium sensitivity. All buffer zones will be respected and no development will occur in these areas.

Of note is that this layout was developed as the initial site layout upon commencement of the project. The preferred layout was developed subsequent to this alternative in response to specialist studies undertaken on the site.

Hot water supply

As for the Preferred Alternative (Alternative 1)

Sanitation

As for the Preferred Alternative (Alternative 1)

6.3. Alternative 3 (Technology Alternative)

Layout

Alternative 3 consists of the preferred layout as described in Alternative 1 but with alternative hot water provision and sanitation services as follows:

Hot water supply

For this alternative, hot water supply will be via solar panels and / or heat recovery.

The required hot water storage and supply for the Bhundu Inn hotel, consisting of the main building, 3 wings and the 10 chalets will be approximately 34 500 litres/ per day.

The use of solar panels and / or heat recovery for air conditioning systems will be used to heat the water. While solar panels are cost efficient, they cannot generate hot water during the evenings. This is a disadvantage due to the fact that for a hospitality development, hot water demands are greatest in the mornings than other peaks during the day.

Heat recovery from air conditioning units would be very difficult and to achieve in this development as accommodation wings are separated from the main building, which would have the highest air conditioning requirement.

Sanitation

For this alternative, sanitation will be via a conventional waste water package plant. The daily sewage flow for the proposed development is anticipated to be 81 000 litres.

All sewage emanating from the main building and 3 hotel room wings will be conveyed directly to a central waste treatment plant. The sludge will then be removed either manually or dried in drying beds after effluent treatment.

This method is not viable for this development for a number of reasons. Drying beds require a large amount of land, and due to the sensitive environs located over a large portion of the site, the construction of drying beds would not be problematic.

Additionally, drying beds are quite visible, and this is not compatible with the surrounding natural environment or to guest experience. The removal of the sludge once it has dried is also fairly labour intensive and can require the use of trucks. There is also the possibility of ground and surface water contamination if the sludge is not managed and handled by properly trained and committed personnel.

Properly treated effluent emanating from the waste water treatment package plant will be collected in a lined irrigation dam and supply irrigation water to areas landscaped around the development.

Effluent emanating from the septic tank at the chalets will be dissipated via a soak away.

6.4. The No-Go Alternative

The 'No-Go' alternative explores the option where 'nothing is done'. In other words, the status quo remains and the development is shelved. It is this status quo against which the impact of the proposed project is measured.

In order to adequately address the No-Go option, it is necessary to review the project need and desirability as detailed under Section 6 above. The need and desirability essentially explains the positive contribution that the development would realise for the broader environment. In this case, job creation, skills development and unlocking the tourism potential of the region are the main driving forces behind the need of the project.

While potential environmental impacts associated with the expansion will be avoided by choosing the no-go alternative, the positive impacts of increasing tourism diversity in the area and potential linkages with SS Skosana and Mabusa Nature Reserves, far outweigh such impacts.

7 OVERVIEW OF POTENTIAL ENVIRONMENTAL IMPACTS

7.1 General

The expansion of the Hotel will take place within demarcated areas only, with the appropriate buffer zones in place (32 m for the wetland and drainage lines and 50 m for the Riparian habitat).

The layout of the Hotel has specifically taken the marula and tamboti trees located on site into consideration. No marula tress (nationally protected) will be removed or disturbed during the construction phase. Individual buildings will be shifted slightly to make provision for these trees wherever necessary.

A small percentage (i.e. less than 30%) of the tamboti trees (Protected in Mpumalanga) will have to be removed, though the necessary permits and authorization will be obtained from the MTPA.

A small section of one wing of the Hotel does extend into areas of medium sensitivity where the rocky outcrop/ Gladiolus habitat exists. The recommended buffer for this area cannot be respected due to the limited extent of low sensitivity development area on the site. This small encroachment is considered an acceptable trade-off on this site, provided protected plants are identified and relocated prior to the commencement of construction in these areas.

7.2 Potential impacts identified

Potential environmental impacts (positive ad negative) have been identified for all the construction phase and operational phase. Cumulative impacts have also been identified.

7.2.1 Planning and Design Phase

Direct Impacts:

GROUND WATER

- Risk to ground water resources due to the development of sewage infrastructure.

HYDROLOGY (SURFACE WATER)

- Disturbance and loss of ecological function of the habitat along the river, drainage lines and in the wetland due to placement of structures and infrastructure and storm water discharge within the habitat and / or within the demarcated buffers.
- Disturbance and loss of hydrological function of the river, drainage line and wetland due to due to placement of structures and infrastructure and storm water discharge within the habitat and / or within the demarcated buffers.
- Risk to surface water resources (river, drainage line and wetland) due to the development of sewage infrastructure.

SOIL

- Disturbance of highly erodible duplex soils within the wetland due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.

AIR

- None.

BIODIVERSITY (FLORA)

- Loss of Central Sandy Bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.
- Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetation and Gladiolus and Orchid habitat due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.
- Destruction and damage of protected plant and tree species, specifically marula's, and tamboti's due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.

BIODIVERSITY (FAUNA)

- Loss of faunal habitat and habitat fragmentation due to removal and alteration of existing habitat due to the development of permanent structures and infrastructure.

LAND USE AND AGRICULTURAL POTENTIAL

- Loss of potentially arable land due to the development of permanent structures and infrastructure.

HERITAGE

- None.

VISUAL

- Visual impact on users of main and secondary roads in close proximity to the site
- Visual impact on residents of homesteads and settlements in close proximity to the site
- Visual impact on sensitive visual receptors within the region
- Visual impact of lighting on visual receptors in close proximity to the site

MUNICIPAL SERVICES AND TRAFFIC

- None.

Indirect Impacts:

- Visual impact of the proposed expansion of the Bhundu Inn Hotel on the visual character of the landscape and sense of place of the region.
- The visual impact of the proposed expansion of the Bhundu Inn Hotel on tourist facilities and tourist access routes within the region.

Cumulative Impacts:

BIODIVERSITY (FLORA)

- Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.
- Cumulative reduction of protected plant and tree species, specifically marula's, and tamboti's. This results in a reduction in the overall existence of these species.
- Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation. This results in a reduction in the overall extent of riparian and wetland environments.

7.2.2 Construction Phase

Direct Impacts:

GROUND WATER

- Depletion of ground water due to overuse and waste during construction activities.
- Pollution and contamination of ground water due to:
    - Surface runoff
    - Unmanaged sewage discharge
    - Discharge of solvents, paints, chemicals etc.
    - Hydrocarbon and fuel leaks and spills
    - Sewage leaks and spills

HYDROLOGY (SURFACE WATER)

- Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage line and in the wetland due to:
    - Clearing and destruction of riparian and wetland vegetation
    - Loss of fringing vegetation and erosion of denuded areas
    - Invasion by alien invasive trees and plants
    - Alteration in natural fire regimes
    - Shading of natural vegetation
- Pollution and contamination of surface water due to:
    - Unmanaged runoff of grey water, cement slurry and wash water.
    - Unmanaged sewage discharge
    - Solvent, paints and chemical spills
    - Litter and other inert construction waste.
    - Hydrocarbon and fuel leaks and spills
    - Sewage leaks and spills
- Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland due to:
    - Impeded and / or redirected flow due to activity within the water course
    - Uncontrolled discharges into the water resource (storm water)
    - Alteration of surface characteristics (roughness) due to activity within the water course
    - Removal of stabilising vegetation
    - Sedimentation and siltation from erosion

SOIL

- Soil contamination and pollution due to:

    - Unmanaged surface runoff (grey water, cement slurry and wash water)
    - Hydrocarbon and fuel leaks and spills
    - Litter and other inert construction waste.
    - Discharge of solvents, paints, chemicals etc.
    - Unmanaged sewage discharge
- Soil erosion by wind and rain due to:
    - The removal of stabilising vegetation
    - Soil compaction by movement of construction vehicles, equipment and activities
    - Decrease in water infiltration and an increase of water runoff in construction areas
    - Disturbance of highly erodible duplex soils within the wetland

AIR

- Air pollution due emissions from construction vehicles and equipment.
- Dust liberated by general construction activities and movement of construction vehicles.
- Smoke from open fires used by site staff for heating and cooking as well as from uncontrolled fires.

BIODIVERSITY (FLORA)

- Removal of exotic and declared invader species (positive impact).
- Loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP due to:
    - Site clearing ahead of construction
    - General construction activities and movement of construction vehicles
- Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetation and Gladiolus and Orchid habitat due to:
    - Site clearing ahead of construction
    - General construction activities and movement of construction vehicles
- Removal of protected plant and tree species, specifically marula's, and tamboti's due to:
    - Site clearing ahead of construction
    - General construction activities and movement of construction vehicles
- Loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation due to:
    - Site clearing ahead of construction
    - General construction activities and movement of construction vehicles
    - Removal of large trees and resulting destabilised soil conditions
- Increase in exotic vegetation / alien species and bush encroachment into disturbed soils and areas due to:
    - Unmanaged cleared and disturbed areas as well as stockpiles
    - Unrehabilitated areas cleared and disturbed during construction
    - Construction vehicles operating on other sites and carrying material and seed onto site

BIODIVERSITY (FAUNA)

- Loss of faunal habitat (most likely species occupying warrens or burrow systems such as the various rodent species and the aardvark, aardwolf, cape fox and black

backed jackal whose breeding, foraging and roosting habitats could be destroyed) due to:
    - Site clearing ahead of construction
    - General construction activities and movement of construction vehicles
- Faunal disturbances and temporary changes in the distribution and abundance of faunal species due to:
    - Presence of construction personnel and increased activity on site
    - Noise due to construction activities
    - Removal of habitat
- Mortality of fauna due to:
    - exposure to contaminants such as solvents, paints, chemicals etc.
    - Collisions with construction vehicles
    - Persecution and extermination
- Poaching and snaring of fauna on site and in SS Skosana Nature Reserve by construction staff.

LAND USE AND AGRICULTURAL POTENTIAL

- Loss of potentially arable land due to:
    - Site clearing ahead of construction
    - General construction activities and movement of construction vehicles

HERITAGE

- Damage to and / or destruction of low significance Early, Middle and Later Stone Age tools and house foundations on the site.
- Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction.

VISUAL

- Potential visual impact of construction, lighting and dust on conservation areas within the region, specifically SS Skosana and Mabusa Nature Reserves.
- Potential visual impact of construction, lighting and dust on visual receptors in close proximity to the site

SOCIO-ECONOMICS

- Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.) (Positive impact).
- Short term employment and business opportunities and the opportunity for skills development and on-site training. (Positive impact).
- Noise impact on conservation areas within the region, specifically SS Skosana and Mabusa Nature Reserves.
- An increase in construction workers and associated increase in social problems for the community, including:
    - An increase in alcohol and drug use;
    - An increase in crime levels;
    - An increase in teenage and unwanted pregnancies;
    - An increase in prostitution;
    - An increase in sexually transmitted diseases (STDs).
- Increase in casual workers and associated increase in poaching and potential vandalism within the region.
- Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site.

- Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires

MUNICIPAL SERVICES AND TRAFFIC

- Increase in the number and frequency of vehicles (construction vehicles) and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities.
- Disturbance of Eskom infrastructure due to work within the Eskom servitude

Indirect Impacts:

- None.

Cumulative Impacts:

BIODIVERISTY (FLORA)

- Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation
- Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.
- Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.

SOCIO-ECONOMICS

- Opportunity to up-grade and improve skills levels in the area (positive impact)

MUNICIPAL SERVICES AND TRAFFIC

- Degradation of local roads infrastructure due to increased numbers of heavy vehicles and construction deliveries.
- Cumulative increase in traffic and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities.

7.2.3 Operational Phase

Direct Impacts:

GROUND WATER

- Depletion of ground water due to overuse and waste during operation.
- Pollution and contamination of ground water due to:
    - Unmanaged storm water runoff
    - Unmanaged sewage discharge
    - Sewage leaks and spills
    - Herbicides, pesticides and fertilisers used in gardens

    - Discharge and spill of solvents, paints, chemicals and cleaning products
    - Discharge and spill of hydrocarbons and fuel

HYDROLOGY (SURFACE WATER)

- Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage lines and in the wetland due to:
    - The removal of natural vegetation to make way for manicured gardens
    - Encroachment of alien invasive species
    - Uncontrolled access by staff and guests
- Pollution and contamination of surface water due to:
    - Unmanaged storm water runoff
    - Litter and uncontrolled waste
    - Unmanaged sewage discharge
    - Sewage leaks and spills
    - Herbicides, pesticides and fertilisers used in gardens
    - Discharge and spill of solvents, paints, chemicals and cleaning products
    - Discharge and spill of hydrocarbons and fuel
- Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland due to:
    - Uncontrolled discharges into the water resource (storm water)
    - Alteration of surface characteristics (roughness) due to activity within the water course (uncontrolled access by staff and guests)
    - Removal of stabilising vegetation (uncontrolled clearing and access by staff and guests)
    - Sedimentation and siltation from erosion

SOIL

- Soil contamination and pollution due to:
    - Unmanaged storm water runoff (especially roads and parking areas)
    - Litter and uncontrolled waste
    - Unmanaged sewage discharge
    - Sewage leaks and spills
    - Herbicides, pesticides and fertilisers used in gardens
    - Discharge and spill of solvents, paints, chemicals and cleaning products
    - Discharge and spill of hydrocarbons and fuel
- Soil erosion due to:
    - Unmanaged storm water runoff (all hard surfaces)
    - Soil compaction by uncontrolled movement of staff and guests (especially vehicles)
    - Runoff over exposed or cleared areas that have failed to rehabilitate.
    - Disturbance of highly erodible duplex soils within the wetland

AIR

- Air pollution by emission from private vehicles and busses travelling to and from the site.
- Smoke from uncontrolled fires.

BIODIVERSITY (FLORA)

- Loss of Central Sandy Bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP due to:
    - The removal of natural vegetation to make way for manicured gardens
    - Encroachment of alien invasive species
    - Uncontrolled access by staff and guests
    - Litter and waste
- Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetation and Gladiolus and Orchid habitat due to:
    - Encroachment of alien invasive species
    - Uncontrolled access by staff and guests
    - Litter and waste
- Destruction and damage of protected plant and tree species, specifically marula's, and tamboti's due to uncontrolled access by staff and guests
- Loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation due to:
    - Encroachment of alien invasive species
    - Uncontrolled access by staff and guests
    - Litter and waste
- Colonisation and re-emergence of exotic vegetation / alien species and bush encroachment into disturbed soils and poorly rehabilitated areas. Alien invasive species tend to out-compete indigenous, slower growing species and could also result in unsuccessful rehabilitation.

BIODIVERSITY (FAUNA)

- Loss of faunal habitat due to:
    - The removal of natural vegetation to make way for manicured gardens
    - Encroachment of alien invasive species
    - Uncontrolled access by staff and guests
    - Litter and waste
- Faunal disturbances and temporary changes in the distribution and abundance of faunal species due to:
    - General operations (activities) of the facility
    - Noise from guests and staff
    - Uncontrolled access by staff and guests
- Mortality of fauna due to:
    - Exposure to contaminants such as herbicides, pesticides, solvents and cleaning products
    - Collisions with vehicles
    - Persecution and extermination
- Poaching and snaring of fauna on site and in SS Skosana Nature Reserve by staff.

LAND USE AND AGRICULTURAL POTENTIAL

- None.

HERITAGE

- None.

VISUAL

- Visual impact on users of main and secondary roads in close proximity to the site
- Visual impact on residents of homesteads and settlements in close proximity to the site
- Visual impact on sensitive visual receptors within the region
- Visual impact of lighting on visual receptors in close proximity to the site

SOCIO-ECONOMICS

- Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.) (Positive impact).
- Long term employment and business opportunities and the opportunity for skills development and on-site training. (Positive impact).
- Noise impact on conservation areas within the region, specifically SS Skosana and Mabusa Nature Reserves.
- Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires

MUNICIPAL SERVICES AND TRAFFIC

- Increase in the number and frequency of vehicles (private vehicles and busses) accessing the site, and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities.

Indirect Impacts:

VISUAL

- Visual impact of the proposed expansion of the Bhundu Inn Hotel on the visual character of the landscape and sense of place of the region.
- The visual impact of the proposed expansion of the Bhundu Inn Hotel on tourist facilities and tourist access routes within the region.

Cumulative Impacts:

BIODIVERISITY (FLORA)

- Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.
- Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.
- Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.

VISUAL

- The accumulation of built forms and within an otherwise natural environment.

SOCIO ECONOMICS

- Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area (positive impact).
- Promotion of social and economic development in the local communities and improvement in the overall well-being of the community (positive impact).

MUNICIPAL SERVICES AND TRAFFIC

- Degradation of local roads infrastructure due to increased numbers of tourist vehicles and deliveries.
- Cumulative increase in traffic and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities.

7.2.4 Decommissioning Phase

The decommissioning of the facility is not anticipated at this stage and, therefore, no impacts are anticipated

8 ENVIRONMENTAL IMPACT EVALUATION

8.1 Assessment Criteria

The impacts anticipated to occur as a result of the proposed development are assessed / evaluated to determine their significance. The following assessment criteria are used:

Extent (how far the impact extends):

- **(1) Very low:** within the site only
- **(2) Low:** within the local neighbourhoods
- **(3) Medium:** within the region
- **(4) High:** Nationally
- **(5) Very high:** Internationally

Duration (the timeframe over which the effects of the impact will be felt):

- **(1) Very short:** 0-1 years
- **(2) Short:** 2-5 years
- **(3) Medium:** 5-15 years
- **(4) Long:** >15 years
- **(5) Permanent**

Magnitude (the severity or size of the impact):

- (**0) None**
- **(2) Minor**
- **(4) Low**
- **(6) Moderate**
- **(8) High**

- **(10) Very High**

Probability (the likelihood of the impact actually occurring):

- **(1) Very improbable:** Less than 20% sure of the likelihood of an impact occurring
- **(2) Improbable:** 20-40% sure of the likelihood of an impact occurring
- **(3) Probable:** 40-60% sure of the likelihood of an impact occurring
- **(4) Highly probable:** 60-80% sure of the likelihood of that impact occurring
- **(5) Definite:** More than 80% sure of the likelihood of that impact occurring

The **significance** of the potential visual impact is determined by the sum of the individual scores for extent, duration and magnitude multiplied by the **probability** of the impact occurring i.e. **significance = (extent + duration + magnitude) x probability.**

The significance rating scale is interpreted as follows:

- **(0-12) Negligible:** Impact would be of a very low order. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit.

- **(13-30) Low**: Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.

- **(31-56) Moderate:** Impact would be real but not substantial. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts, other means of achieving these benefits would be about equal in time, cost, and effort**.**

- **(57-90) High**: Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.

- **(91-100) Very High:** Of the highest order possible. In the case of negative impacts, there would be no possible mitigation and / or remedial activity and in the case of positive impacts, there is no real alternative to achieving the benefit.

8.2. Environmental Impact Assessment

The full Environmental Impact Assessment for all Alternatives in terms Planning, Construction and Operation has been included in Appendix G. Direct, Indirect and Cumulative impacts have also been addressed. Mitigation measures have been listed in Appendix G as well as in the Draft EMPr (Appendix F).

A summary of the significance of the anticipated impacts With Mitigation (WM) and Without Mitigation (WOM) has been included below:

8.2.1 Impacts that may result from the Planning and Design Phase

ALTERNATIVE A1 (PREFERRED ALTERNATIVE)		
Direct Impacts		
Ground water		
Risk to ground water resources (water quality) due to the development of sewage infrastructure.	**M**	**L**
Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat along the river, drainage lines and in the wetland due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.	**M**	**L**
Risk to surface water resources (river, drainage line and wetland) due to the development of sewage infrastructure.	**M**	**L**
Soil		
Disturbance of highly erodible duplex soils within the wetland due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.	**M**	**L**
Air		
None.		
Biodiversity (Flora)		
Loss of Central Sandy Bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP due to placement of structures and infrastructure and storm water discharge within the habitat and / or within the demarcated buffers.	**H**	**L**
Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetation and Gladiolus and Orchid habitat due to placement of structures and infrastructure and storm water discharge within the habitat and / or within the demarcated buffers.	**H**	**M**
Destruction and damage of protected plant and tree species, specifically Marula's, and Tamboti's due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.	**H**	**M**
Biodiversity (Fauna)		
Loss of faunal habitat and habitat fragmentation due to removal and alteration of existing habitat due to the development of permanent structures and infrastructure.	**M**	**L**
Land Use & Agricultural Potential		
Loss of potentially arable land due to the development of permanent structures and infrastructure.	**L**	**L**
Heritage		
None.		
Visual		
Visual impact on users of main and secondary roads in close proximity to the site	**L**	**L**
Visual impact on residents of homesteads and settlements in close proximity to the site	**L**	**L**
Visual impact on sensitive visual receptors within the region	**M**	**L**
Visual impact of lighting on visual receptors in close proximity to the site	**M**	**L**
Socio-economics		
None.		
Municipal services & traffic		
None.		
Indirect Impacts		
Visual		
Visual impact of the proposed expansion of the Bhundu Inn Hotel on the visual character of the landscape and sense of place of the region.	**M**	**M**
The visual impact of the proposed expansion of the Bhundu Inn Hotel on tourist facilities and tourist access routes within the region.	**M**	**M**
Cumulative Impacts		
Biodiversity (Flora)		
Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.	**H**	**L**

Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.	**H**	**M**
Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.	**H**	**M**

ALTERNATIVE A2 (LAYOUT)		
Direct Impacts		
Ground water		
Risk to ground water resources (water quality) due to the development of sewage infrastructure and construction of access roads.	**H**	**M**
Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat along the river, drainage lines and in the wetland due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.	**H**	**M**
Risk to surface water resources (river, drainage line and wetland) due to the development of sewage infrastructure and built infrastructure.	**H**	**M**
Soil		
Disturbance of highly erodible duplex soils within the wetland due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.	**H**	**M**
Air		
As per Alternative 1		
Biodiversity (flora)		
Loss of Central Sandy Bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP due to placement of structures and infrastructure and storm water discharge within the habitat and / or within the demarcated buffers.	**H**	**H**
Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetation and Gladiolus and Orchid habitat due to placement of structures and infrastructure and storm water discharge within the habitat and / or within the demarcated buffers.	**H**	**H**
Destruction and damage of protected plant and tree species, specifically Marula's, and Tamboti's due to placement of structures and infrastructure within the habitat and / or within the demarcated buffers.	**H**	**H**
Biodiversity (Fauna)		
Loss of faunal habitat and habitat fragmentation due to removal and alteration of existing habitat due to the development of permanent structures and infrastructure	**M**	**M**
Land use and Agricultural potential		
As per Alternative 1		
Heritage		
As per Alternative 1		
Visual		
As per Alternative 1		
Socioeconomic		
As per Alternative 1		
Municipal services and traffic		
As per Alternative 1		
Indirect Impacts		
As per Alternative 1		
Cumulative Impacts		
Biodiversity (Flora)		
Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.	**H**	**H**
Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.	**H**	**H**

Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.	**H**	**H**

ALTERNATIVE A3 (TECHNOLOGY)		
Direct Impacts		
Ground water		
As per Alternative 1.		
Hydrology (surface water)		
As per Alternative 1.		
Soil		
As per Alternative 1		
Air		
As per Alternative 1		
Biodiversity (Flora)		
As per Alternative 1		
Biodiversity (Fauna)		
As per Alternative 1		
Land use and Agricultural potential		
As per Alternative 1		
Heritage		
As per Alternative 1		
Visual		
As per Alternative 1		
Socioeconomic		
As per Alternative 1		
Municipal services and traffic		
As per Alternative 1		
Indirect Impacts		
As per Alternative 1		
Cumulative Impacts		
As per Alternative 1		

NO-PROJECT ALTERNATIVE		
Direct Impacts		
Socio Economics		
None.		
Indirect Impacts		
None.		
Cumulative Impacts		
Socio Economics		
None.		

8.2.2 Impacts that may result from the Construction Phase

ALTERNATIVE A1 (PREFERRED ALTERNATIVE)		
Direct Impacts		
Ground water		
Depletion of ground water due to overuse and waste during construction activities	**M**	**L**
Pollution and contamination of ground water.	**M**	**L**
Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage lines and in the wetland .	**L**	**N**
Pollution and contamination of surface water.	**M**	**L**
Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland.	**L**	**N**
Soil		
Soil contamination and pollution.	**L**	**L**

Soil erosion by wind and rain.	**M**	**N**
Air		
Air pollution due emissions from construction vehicles and equipment.	**M**	**L**
Dust liberated by general construction activities and movement of construction vehicles.	**M**	**L**
Smoke from open fires used by site staff for heating and cooking as well as from uncontrolled fires.	**L**	**L**
Biodiversity (Flora)		
Removal of exotic and declared invader species (positive impact).	**L**	**M**
Loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP.	**M**	**L**
Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetaion and Gladiolus and Orchid habitat.	**M**	**L**
Removal of protected plant and tree species, specifically Marula's, and Tamboti's.	**H**	**M**
Loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation.	**M**	**L**
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas.	**L**	**N**
Biodiversity (Fauna)		
Loss of faunal habitat (most likely species occupying warrens or burrow systems such as the various rodent species and the aardvark, aardwolf, cape fox and black backed jackal whose breeding, foraging and roosting habitats could be destroyed).	**L**	**L**
Faunal disturbances and temporary changes in the distribution and abundance of faunal species. Although many of the larger terrestrial species will vacate the study area and become displaced during the construction phase, it is unlikely that the fauna community structures will change.	**L**	**L**
Mortality of fauna.	**L**	**L**
Poaching and snaring of fauna on site and in SS Skosana Nature Reserve by construction staff.	**M**	**L**
Land Use & Agricultural Potential		
Loss of potentially arable land.	**L**	**L**
Heritage		
Damage to and / or destruction of low significance Early, Middle and Later Stone Age tools and house foundations on the site.	**L**	**N**
Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction.	**L**	**N**
Visual		
Potential visual impact of construction, lighting and dust on conservation areas within the region, specifically SS Skosana and Mabusa Nature Reserves.	**L**	**L**
Potential visual impact of construction, lighting and dust on visual receptors in close proximity to the site.	**L**	**L**
Socio-economics		
Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.). (positive impact)	***N***	***L***
Short term employment and business opportunities and the opportunity for skills development and on-site training. (Positive impact).	***N***	***L***
Noise impact on conservation areas within the region, specifically SS Skosana and Mabusa Nature Reserves.	**M**	**L**
An increase in construction workers and associated increase in social problems for the community.	**N**	**N**
Increase in casual workers and associated increase in poaching and potential vandalism within the region.	**N**	**N**
Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site.	**M**	**L**
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires	**M**	**L**
Municipal services & traffic		
Increase in number and frequency of vehicles (construction vehicles) and the resultant noise,	**M**	**L**

dust, and safety impacts for other road users and the residents of the local communities.		
Disturbance of Eskom infrastructure due to work within the Eskom servitude	**L**	**N**
Indirect Impacts		
None.		
Cumulative Impacts		
Biodiversity (Flora)		
Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.	**M**	**L**
Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.	**M**	**L**
Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.	**H**	**L**
Socio-economics		
Opportunity to up-grade and improve skills levels in the area. (positive impact)	***N***	***L***
Municipal services & traffic		
Degradation of local roads infrastructure due to increased numbers of heavy vehicles and construction deliveries.	**M**	**L**
Cumulative increase in traffic and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities	**M**	**L**

ALTERNATIVE A2 (LAYOUT)		
Direct Impacts		
Ground Water		
Depletion of ground water due to overuse and waste during construction activities	**M**	**L**
Pollution and contamination of ground water.	**M**	**M**
Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage lines and in the wetland.	**H**	**M**
Pollution and contamination of surface water.	**H**	**M**
Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland.	**H**	**M**
Soil		
Soil contamination and pollution.	**M**	**L**
Soil erosion by wind and rain.	**M**	**M**
Air		
As per Alternative 1		
Biodiversity (flora)		
Removal of exotic and declared invader species (positive impact).	**L**	**M**
Loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP.	**H**	**H**
Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetaion and Gladiolus and Orchid habitat.	**H**	**H**
Removal of protected plant and tree species, specifically Marula's, and Tamboti's.	**H**	**H**
Loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation.	**H**	**H**
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas. The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape.	**L**	**N**
Biodiversity (fauna)		
Loss of faunal habitat (most likely species occupying warrens or burrow systems such as the	**M**	**M**

various rodent species and the aardvark, aardwolf, cape fox and black backed jackal whose breeding, foraging and roosting habitats could be destroyed).		
Land use and Agricultural Potential		
As per Alternative 1		
Heritage		
As per Alternative 1		
Visual		
As per Alternative 1		
Socioeconomic		
As for Alternative 1		
Municipal services and Traffic		
As for Alternative 1		
Indirect Impacts		
None.		
Cumulative Impacts		
Biodiversity (Flora)		
Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.	**H**	**H**
Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.	**H**	**H**
Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.	**H**	**H**

ALTERNATIVE A3 (TECHNOLOGY)		
Direct Impacts		
Ground water		
As per Alternative 1.		
Hydrology (surface water)		
As per Alternative 1.		
Soil		
As per Alternative 1.		
Air		
As per Alternative 1		
Biodiversity (Flora)		
As per Alternative 1		
Biodiversity (Fauna)		
As per Alternative 1		
Land use and Agricultural potential		
As per Alternative 1		
Heritage		
As per Alternative 1		
Visual		
As per Alternative 1		
Socioeconomic		
Higher capital cost for installation of greener technology, especially energy solutions	**N**	**N**
Municipal services and traffic		
As per Alternative 1		
Indirect Impacts		
None.		
Cumulative Impacts		
As per Alternative 1.		

NO-PROJECT ALTERNATIVE		
Direct Impacts		
None		

Indirect Impacts		
None.		
Cumulative Impacts		
None.		

8.2.3 Impacts that may result from the Operational Phase

ALTERNATIVE A1 (PREFERRED ALTERNATIVE)		
Direct Impacts		
Ground water		
Depletion of ground water resources (water quality) due to over use and waste during operation.	**L**	**L**
Pollution and contamination of ground water.	**M**	**L**
Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage lines and in the wetland.	**L**	**L**
Pollution and contamination of surface water.	**M**	**L**
Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland.	**L**	**L**
Soil		
Soil contamination and pollution.	**L**	**L**
Soil erosion.	**L**	**L**
Air		
Air pollution by emission from private vehicles and busses travelling to and from the site.	**L**	**L**
Smoke from uncontrolled fires	**M**	**L**
Biodiversity (Flora)		
Loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP.	**M**	**L**
Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetaion and Gladiolus and Orchid habitat.	**M**	**L**
Destruction and damage of protected plant and tree species, specifically Marula's, and Tamboti's due to uncontrolled access by staff and guests	**M**	**L**
Loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation. The lack of natural vegetation in and around the wetland could drastically reduce water holding capacity and the subsequent loss of the ecological function of the vegetation as catchment to the watercourse.	**M**	**L**
Colonisation and re-emergence of exotic vegetation / alien species and bush encroachment into disturbed soils and poorly rehabilitated areas. Alien invasive species tend to out-compete indigenous, slower growing species and could also result in unsuccessful rehabilitation. The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape.	**L**	**L**
Biodiversity (Fauna)		
Loss of faunal habitat.	**L**	**L**
Faunal disturbances and temporary changes in the distribution and abundance of faunal species.	**L**	**L**
Mortality of fauna.	**L**	**N**
Poaching and snaring of fauna on site and in SS Skosana Nature Reserve by staff.	**L**	**N**
Land Use & Agricultural Potential		
None.		
Heritage		
None.		
Visual		
Visual impact on users of main and secondary roads in close proximity to the site	**L**	**L**
Visual impact on residents of homesteads and settlements in close proximity to the site	**L**	**L**

Visual impact on sensitive visual receptors within the region	**M**	**L**
Visual impact of lighting on visual receptors in close proximity to the site	**M**	**L**
Socio-economics		
Stimulation of the local economy, especially the local service delivery industry (accommodation, catering, cleaning, transport, security etc.). *(positive impact)*	***L***	***M***
Long term employment and business opportunities and the opportunity for skills development and on-site training. *(positive impact)*	***L***	***L***
Noise impact on conservation areas within the region, specifically SS Skosana and Mabusa Nature Reserves.	**M**	**L**
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires.	**L**	**N**
Municipal services & traffic		
Increase in the number and frequency of vehicles (private vehicles and busses) accessing the site, and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities.	**M**	**M**
Indirect Impacts		
Visual		
Visual impact of the proposed expansion of the Bhundu Inn Hotel on the visual character of the landscape and sense of place of the region.	**M**	**L**
The visual impact of the proposed expansion of the Bhundu Inn Hotel on tourist facilities and tourist access routes within the region.	**L**	**L**
Cumulative Impacts		
Biodiversity (Flora)		
Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.	**M**	**L**
Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.	**M**	**L**
Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.	**M**	**L**
Visual		
The accumulation of built forms and within an otherwise natural environment.	**L**	**L**
Socio-economics		
Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area. *(positive impact)*	***L***	***L***
Promotion of social and economic development in the local communities and improvement in the overall well-being of the community. *(positive impact)*	***L***	***L***
Municipal services and traffic		
Degradation of local roads infrastructure due to increased numbers of tourist vehicles and deliveries.	**M**	**M**
Cumulative increase in traffic and the resultant noise, dust, and safety impacts for other road users and the residents of the local communities.	**M**	**M**

ALTERNATIVE A2 (LAYOUT)		
Direct Impacts		
Ground water		
Depletion of ground water resources due to over use and waste during operation.	**M**	**L**
Pollution and contamination of ground water.	**M**	**L**
Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage lines and in the wetland.	**H**	**H**
Pollution and contamination of surface water.	**H**	**M**

Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland.	**H**	**H**
Soil		
Soil erosion.	**H**	**M**
Air		
As per Alternative 1		
Biodiversity (Flora)		
Loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP.	**H**	**H**
Disturbance of sensitive environments, specifically riparian and wetland vegetation, Rocky Bushveld vegetaion and Gladiolus and Orchid habitat.	**H**	**H**
Destruction and damage of protected plant and tree species, specifically Marula's, and Tamboti's due to uncontrolled access by staff and guests	**L**	**L**
Loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation. The lack of natural vegetation in and around the wetland could drastically reduce water holding capacity and the subsequent loss of the ecological function of the vegetation as catchment to the watercourse.	**H**	**H**
Colonisation and re-emergence of exotic vegetation / alien species and bush encroachment into disturbed soils and poorly rehabilitated areas. Alien invasive species tend to out-compete indigenous, slower growing species and could also result in unsuccessful rehabilitation. The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape.	**M**	**L**
Biodiversity (Fauna)		
Loss of faunal habitat.	**M**	**L**
Land use and agriculture potential		
As per Alternative 1		
Heritage		
As per Alternative 1		
Visual		
As per Alternative 1		
Socioeconomic		
As per Alternative 1		
Municipal services and traffic		
As per Alternative 1		
Indirect Impacts		
As for Alternative 1		
Cumulative Impacts		
Biodiversity (Flora)		
Cumulative loss of Central Sandy bushveld vegetation and associated loss of floral species richness and genetic diversity of a vegetation type classified as vulnerable and highly significant by the MBCP. This results in a reduction in the overall extent of the Central Sandy bushveld vegetation.	**H**	**H**
Cumulative loss of ecological function and habitat function of sensitive environments, specifically riparian and wetland vegetation Rocky Bushveld vegetation and Gladiolus and Orchid habitat. This results in a reduction in the overall extent of riparian and wetland environments.	**H**	**H**
Cumulative reduction of protected plant and tree species, specifically Marula's, and Tamboti's. This results in a reduction in the overall existence of these species.	**L**	**L**

ALTERNATIVE A3 (TECHNOLOGY)		
Direct Impacts		
Ground water		
Depletion of ground water resources due to over use and waste during operation.	**L**	**L**
Pollution and contamination of ground water.	**H**	**M**

Hydrology (surface water)		
Disturbance and loss of ecological function of the habitat (physical structure) along the river, drainage lines and in the wetland.	**M**	**L**
Pollution and contamination of surface water.	**M**	**L**
Disturbance and loss of hydrological function (quality and fluctuation properties) of the river, drainage line and wetland.	**M**	**L**
Soil		
Soil contamination and pollution.	**M**	**L**
Soil erosion.	**L**	**L**
Air		
As for Alternative 1		
Biodiversity (Flora)		
As for Alternative 1		
Biodiversity (Fauna)		
As for Alternative 1		
Land use and agriculture potential		
As for Alternative 1		
Heritage		
As for Alternative 1		
Visual		
As for Alternative 1		
Socioeconomic		
Pollution risk associated with sewage treatment (drying beds) due to the consistent management that is required.	**L**	**L**
Higher operational cost in the long term due to complete dependence on Eskom utility	**L**	**L**
Municipal services and traffic		
As for Alternative 1		
Indirect Impacts		
As for Alternative 1		
Cumulative Impacts		
As for Above.		

NO-PROJECT ALTERNATIVE		
Direct Impacts		
No stimulation of the local economy, especially the local service delivery industry.	**M**	**M**
No short term employment through skills development and on-site training.	**M**	**M**
Indirect Impacts		
None.		
Cumulative Impacts		
No opportunity to up-grade and improve skill levels in the area.	**M**	**M**

8.2.4 Decommissioning Phase

The decommissioning of the facility is not anticipated at this stage and, therefore, no impacts are assessed.

8.3. Discussion of Alternatives

The existing Bhundu Inn Hotel lies to the north of the property boundary and is bordered by the SS Skosana Nature Reserve to the north west and the Moses River to the east. A seep wetland lies adjacent to the existing Hotel to the north east and drains into the Moses River and two ephemeral drainage lines are located in the south of the site.

For all 3 Alternatives, the proposed expansion of the Bhundu Inn Hotel requires that natural vegetation will need to be removed. Disturbance of soils will occur during the construction of new structures and amenities and the installation of new services and

infrastructure. Phase 1 of the proposed development lies in the north of the property with the wings of the Hotel fanning out in an arc. Phase 2 is located in the south.

8.3.1. Alternative 1 (Preferred Alternative)

In the Preferred Alternative, the main body of the hotel and the 3 wings will be located on transformed land (low sensitivity), although a small portion will be located in an area of medium ecological sensitivity. Refer to Maps A.3.1 and A.5.1.

In terms of watercourses, this layout respects all buffer areas of watercourses on the site (i.e. the wetland, the Moses River and the drainage lines). Refer to Maps A.4.1 and A.5.1.

A small portion (less than 30%) of the tamboti trees will need to be removed due to the location of one of the wings. The buffer zone for the rocky outcrop (Gladiolus habitat) cannot be respected due to the limited area of low sensitivity land available for development. This is, however considered to be a fair trade-off, provided protected plants occurring within this area are removed and relocated prior to the commencement of construction works.

In terms of hot water supply, heat pumps will be utilized which are cost effective and energy efficient.

Sanitation requirements will be met via the use of 5 separate centralized septic tanks with a central waste water treatment package plant for the northern section, and soak ways for the south. Purified effluent will be used for irrigation. The environmental impacts will not be significant, and this closed and self contained system does not pose a threat for the ground or surface water.

The preferred Alternative is deemed to have the lowest environmental impact in terms of sensitivity and the significance of the impacts during the construction phase. These construction impacts, if properly managed according to the mitigation measures proposed in this report and the EMPr, will result in negligible to low significance post mitigation, with the exception of the removal of protected plant and tree species, specifically Marula's, and Tamboti's which will result in medium significance post mitigation. No residual impacts will be of high or very high significance.

Operational impacts for the expansion of the Hotel can be similarly mitigated and residual impacts will also be of negligible to low significance. However, post mitigation for municipal traffic will be of medium significance.

The positive impacts, which will be the same for all alternatives, include job creation and employment opportunities for both the construction and operational phase, skills transfer and development, community upliftment. Stimulation of the tourism industry and unlocking the tourism potential in the area will also be positive impacts.

While the footprint of the development will increase with the expansion of the Hotel, the impacts can be adequately and acceptably mitigated provided that the mitigation measures proposed are implemented and adhered to.

8.3.2. Alternative 2 (Layout Alternative)

In the Layout Alternative, the main body of the hotel and the 3 wings will be located on transformed land (low sensitivity), although a small portion will be located in an area of medium ecological sensitivity. Refer to Maps A.3.2 and A.5.2.

In terms of watercourses, this layout respects neither the seep wetland itself nor its buffer area, as the access road traverses both. In addition, the road also infringes into the 50m Riverine buffer area. all buffer areas of watercourses on the site (i.e. the wetland, the Moses River and the drainage lines). Refer to Maps A.4.2 and A.5.2.

In terms of protected species, this alternative shows the main body of the hotel located within the tamboti stand, which will imply a loss of 50% or more. In addition, the southern most wing of the hotel and the access road will encroach on the rocky outcrop (Gladiolus habitat). While this layout affords the guests a scenic route, the internal service roads will not respect the buffer zones of the wetland or the Riparian habitat.

In terms of hot water supply, heat pumps will be utilized which are cost effective and energy efficient.

Sanitation requirements will be met via the use of 5 separate centralized septic tanks with a central waste water treatment package plant for the northern section, and soak ways for the south. Purified effluent will be used for irrigation. The environmental impacts will not be significant, and this closed and self contained system does not pose a threat for the ground or surface water.

Although some encroachment into buffer zones is sometimes unavoidable due to the limited area of low sensitivity land, completely ignoring all buffer zones is not best practice. In this respect, this Alternative Layout is not recommended from an environmental perspective. In spite of the application of mitigation measures, certain planning, construction and operational impacts will remain high.

The positive impacts, which will be the same for all alternatives, include job creation and employment opportunities for both the construction and operational phase, skills transfer and development, community upliftment. Stimulation of the tourism industry and unlocking the tourism potential in the area will also be positive impacts. In spite of these, the environmental trade-off's for the development of this Layout Alternative are not considered acceptable.

8.3.3. Alternative 3 (Technology Alternative)

This alternative includes the layout for the Preferred Alternative, so all arguments for that alternative also hold true for this alternative. However, this alternative includes the

For this alternative, hot water is proposed to be supplied via solar panels and / or heat recovery. Solar panels are prohibitive from a cost perspective, and heat recovery is difficult and expensive to achieve in a decentralised layout such as this one. Therefore, bot these options are considered to be not ideal for this project.

This alternative also includes the provision of a conventional waste water package plant for the main hotel and wings, in which no septic tanks are utilised for primary sludge retention. Therefore, sludge would be treated within the plant, and then be removed manually or dried in drying beds.

In addition to the space required for the drying beds, these are usually quite visible. Although these drying beds may be screened, they are not entirely compatible with tourism land use on the property. Also, the removal of the sludge once it has dried is also fairly labour intensive and can require the use of trucks. There is also the possibility of

ground and surface water contamination if the sludge is not managed and handled by properly trained and committed personnel.

In light of the above, Alternative 3 is not recommended, specifically due to the elevated environmental risks associated with the conventional package plant and drying beds. The inclusion of the septic tank into the sewage system provides an additional level of protection from spillage and leaks, which is considered prudent in this context.

In spite of the application of mitigation measures, certain operation impacts- particularly relating to ground and surface water pollution- will be of a slightly higher significance than in the Preferred Alternative (Alternative 1).

8.3.4 The No Project Alternative

The No Project Alternative implies that the expansion of the Bhundu Inn Hotel as proposed will not take place. In this instance, no negative environmental impacts relating to ground and surface water, biodiversity of the site and aesthetic integrity will be experienced.

The No-Go alternative also implies that no positive impacts or project benefits will be experienced. These include, but are not limited, to:

- Employment opportunities during the construction and operational phase.
- Community upliftment
- Unlocking the tourism potential of the region

Bearing in mind that all significant negative impacts associated with the proposed project can be mitigated and managed, it is recommended that the No-Go alternative not be supported.

9 SPECIALIST RECOMMENDATIONS

9.1 Specialist Vegetation assessment

Dimela Eco Consulting was tasked by NuLeaf Planning and Environmental to undertake a vegetation assessment of the development footprint and surroundings to evaluate the potential impacts on the vegetation.

The report details the approach that was followed in order to effectively assess the site and provide recommendations based on the Terms of Reference given:

- Conduct a Field Survey with specific reference to threatened and protected pant species that could occur within the footprint of the proposed development
- Broad description of the vegetation groupings found on the site, compared to the expected natural state as listed in the national vegetation map (Mucina & Rutherford, 2006)
- Discussion on the vegetation sensitivities observed on the site
- Map of the vegetation groups observed on site, as well as a sensitivity map indicating confirmed or potential habitat for plant species that are of conservation concern and sensitive vegetation groupings

- Recommendations and mitigation measures to reduce the potential impact that the proposed development could have on sensitivity vegetation.

9.1.1 Methodology

The assessment entailed a literature review which included the short listing of plants of conservation concern (threatened and protected plant species) that could potentially occur on the site and immediate surrounds, a field survey, the analysis of data collected and reporting.

Literature Review

The description of the regional vegetation relied on literature from Mucina & Rutherford (2006). Aerial images from Google Earth were assessed prior to the field survey in order to identify areas where disturbances took place, homogenous areas and areas where wetland conditions were likely to occur.

Field Survey

The field survey focussed on identifying unique features that could indicate local sensitivities, such as, threatened and protected plants, as well as, sensitive ecological features such as wetlands, outcrops and rivers. Transects were walked within natural vegetation on the site. In order to identify species, protected trees and variation within the vegetation community, transects concentrated on moving through environmental gradients encountered within the site and surrounds. This was continued until few to no new species were encountered. Any additional information on any other feature thought to have ecological significance within the site, such as dominant species cover, abundance, soil type, erosion, rocky cover, alien/exotic/invasive plants, as well as, plant species of conservation concern and/or their habitat was also recorded.

9.1.2 Detailed Vegetation Assessment

Please see Appendix D.1 for the detailed vegetation assessment report. The assessment was conducted on 30 September 2014, where at the time, no spring rain had fallen.

Vegetation Description	Summary
Transformed land	• The species diversity was observed to be low, while the ecological function and conservation importance was also considered to be low.
Tamboti stand	• It is recommended that this stand is retained as a natural, unique feature.
Bushveld	• The bushveld on deeper soils, although not preferred for development, could be considered for low impact development, provided that the area is assessed for the presence of protected / threatened plant species during the growing season. • The rocky bushveld should be avoided by the proposed development due to the presence of the protected plant species (Gladiolus cf pole-evansii and a Bonatea species).
Vegetation associated with watercourses	• Vegetation associated with the wetland and riparian areas on the site was classified as being of **high sensitivity**, taking into account that the vegetation is important in maintaining the functionality thereof and that all watercourses are protected by national legislation.

9.1.3 Specialist Recommendations

The proposed upgrade can proceed within the transformed vegetation footprint, provided that mitigation measures are adhered to as a minimum. The following mitigation measures apply, though are not limited to:

- *Spirostachys africana* (tamboti) stand be conserved as a unique feature.
- Any expansion into sensitive vegetation should only be considered after an assessment during the flowering period of threatened species that may occur on the site (after sufficient rainfall).
- Where the proposed infrastructure is situated south of the current transformed footprint, the layout should be reconsidered to provide an adequate buffer (50-100m) between the protected plant habitats on the boulder area south of the existing Bhundu Inn footprint.

The full specialist report is contained in Appendix D1. Please also refer to the Environmental Management Programme in Appendix F, which includes all mitigation recommended by the specialists as well as best practice in natural areas.

9.2 Specialist Paleontological Assessment

Professor Marion Bamford, an independent Consultant, was commissioned by NuLeaf Planning and Environmental Pty (Ltd) to assess the paleontological significance of Potion 174 of the Farm Goederede 60 JS.

The following Terms of Reference were provided:

- In order to determine the likelihood of fossils occurring in the affected area geological maps, literature, paleontological databases and published and unpublished records must be consulted.
- If fossils are likely to occur then a site visit must be made by a qualified palaeontologist to locate and assess the fossils and their importance.
- Unique or rare fossils should either be collected (with the relevant SAHRA permit) and removed to a suitable storage and curation facility, for example a Museum or University palaeontology department or protected on site.
- Common fossils can be sacrificed if they are of minimal or no scientific importance but a representative collection could be made if deemed necessary.

9.2.1 Findings

A phase 1 or desktop paleontological assessment was undertaken, whereby published geological and paleontological literature, unpublished records and databases were consulted to determine if there are any records of fossils from the sites and the likelihood of any fossils occurring there.

The rock type is too old and too altered to contain any fossils, more than 2050 Ma. Although the earliest evidence of life is from about 3500 Ma (Cowan, 1995), these unicellular algae and bacteria formed stromatolites in sedimentary settings. The oldest terrestrial fossils are about 360 Ma. The Bushveld Complex is well known for the platinum group elements, which are of economic importance – not fossils.

9.2.2 Recommendation

Since the rocks in this region are either much too old (Proterozoic in age) to contain fossils or are metamorphic or igneous, it is extremely unlikely that any fossils will be found in the proposed construction area. If, however, any fossils are discovered during the construction then it is strongly recommended that a palaeontologist be called to assess their importance and rescue them if necessary.

As far as the palaeontology is concerned the proposed development can go ahead. A phase 2 study is not necessary.

The full specialist report can be found under Appendix D.2. Please also refer to the Environmental Management Programme in Appendix F, which includes all mitigation recommended by the specialists as well as best practice in natural areas.

9.3 Visual Impact Assessment

The Visual Impact Assessment was undertaken by NuLeaf Planning and Environmental, using Geographic Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed expansion of the Bhundu Inn Hotel on Portion 174 of the Farm Goederede 60 JS, Mpumalanga.

9.3.1 Study Approach

The approach utilised to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc.
- The identification of sensitive environments upon which the proposed development could have a potential impact;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

9.3.2 Objective of the Study

The objective of the VIA is to identify and quantify the possible visual impacts related to the proposed upgrade and expansion of the existing Bhundu Inn Hotel (including related infrastructure), as well as, offer potential mitigation measures, where required.

Of relevance to this analysis is the determination following:

- potential visual exposure
- visual distance and observer proximity to the development
- viewer incidence, perception and sensitivity
- visual absorption capacity (VAC)
- visual impact index
- impact significance

9.3.3 Visual Impacts Identified

Anticipated issues related to the potential visual impact the proposed expansion of the existing Bhundu Inn Hotel include the following:

- The visibility of the development to, and potential visual impact on users of roads and observers residing in rural farmsteads within the study area.
- The visibility of the proposed development to, and potential visual impact on residents of built-up centres and populated places (i.e. the settlements of Bhundu, Matshipe and Boekenhouthoek).
- The visibility of the proposed development to, and potential visual impact on protected and conservation areas (i.e. the SS Skosana Nature Reserve and the Mabusa Nature Reserve) .
- The potential visual impact of safety and security lighting of the development at night on receptors in close proximity.
- The potential visual impact associated with the construction of the development on receptors in close proximity.
- The potential visual impact of the development on the visual character of the landscape and sense of place of the region.
- The potential to mitigate visual impacts and inform the design phase.
- The potential cumulative visual impacts of the development within the study area.

9.3.4 Recommendations

Some visual impact has already occurred as a result of the existing Bhundu Inn Hotel. It is therefore expected that the visual impact associated with the new proposed expansion will further contribute to the visual impact currently present on the site.

Considering all factors, it is concluded that the development is appropriate within its context from a visual perspective, and that the anticipated visual impacts are neither unacceptable in nature nor excessive in magnitude. Potential visual impacts are therefore not considered to be a fatal flaw for this development.

Based on the above, it is the recommendation of the author that the proposed development of the expansion to the existing Bhundu Inn Hotel be supported from a visual perspective, subject to the implementation of the required and recommended optimisation and mitigation measures.

The full Visual Impact Assessment can be found under Appendix D.3. Please also refer to the Environmental Management Programme in Appendix F, which includes all mitigation recommended by the specialists as well as best practice in natural areas.

9.4. Cultural Heritage Impact Assessment

Francois P. Coetzee, an independent Cultural Heritage Consultant, was commissioned by NuLeaf Planning and Environmental to undertake a cultural heritage assessment of Portion 174 of the Farm Goederede 60 JS in order to determine the heritage potential and the impact on possible heritage resources.

9.4.1 Objectives

The general aim of this cultural heritage survey is to record and document cultural heritage remains consisting of both tangible and intangible archaeological and historical artefacts, structures (including graves), settlements and oral traditions of cultural significance. As such the terms of reference of the survey were as follows:

- Identify and provide a detailed description of all artefacts, assemblages, settlements and structures of an archaeological or historical nature (cultural heritage sites) located on the study area,
- Estimate the level of significance/importance of the remains in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value,
- Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities, and
- Propose possible mitigation measures which will limit or prevent any impact provided that such action is necessitated by the development.

9.4.2 Methodology

Regional maps and other geographical information (ESRI shapefiles) were supplied by NuLeaf. In addition Google images and topographic maps were used to indicate the survey area. The survey area was localised on the 1:50 000 topographic maps 2529AC.

The survey area was preliminary surveyed and selected areas were investigated on foot using both systematic and intuitive pedestrian survey techniques. Local residents were also consulted during ad hoc interviews to determine the location of any known heritage sites, especially graves.

Additional information on the cultural heritage of the area was sourced from the following records:

- National Mapping Project by SAHRA (which lists heritage impact assessment reports submitted for South Africa)
- Online SAHRIS database
- Maps and information documents supplied by the client
- Published material on the area
- Previous heritage survey completed in the area (Pistorius 2010)

The Surveyor General's database shows the farm Goederede 60 JS was first surveyed in 1889. As no early 20th historical structures were recorded in the survey area the farm was probably used for additional farming activities and no farm house was built.

Furthermore all the records and other studies confirmed that no known historically and archaeologically significant features or settlements have been recorded in the immediate region.

9.4.3 Findings and Recommendations

No archaeological (both Stone Age and Iron Age) and historical structures, features assemblages or artefacts were recorded during the survey. No grave or graveyards were recorded during the survey.

No further action is required.

Based on the assessment, from a heritage perspective, there is no impact on cultural heritage remains and it is recommended that the proposed development should be allowed to continue, taking cognizance of the following as aspects:

- Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in

order for an investigation and evaluation of the find(s) to take place **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

The full Cultural Heritage Impact Assessment can be found under Appendix D.4. Please also refer to the Environmental Management Programme in Appendix F, which includes all mitigation recommended by the specialists as well as best practice in natural areas.

9.5. Wetland Specialist Assessment

NuLeaf Environmental and Planning appointed Imperata Consulting to conduct a watercourse specialist investigation for the proposed Bhundu Inn Hotel and Conference Centre on portion 174 of the farm Goederede 60 JS. The investigation made use of an interdisciplinary approach to incorporate a wide variety of available watercourse indicators and features during the dry season survey.

Terms of references associated with the specialist investigation include the following:

- The delineation and assessment of wetlands and other watercourses present within the study area, including the delineation of wetlands within a 500m radius around the property (henceforth referred to as the study area or site).
- Watercourses identification will be based on definitions specified in the National Water Act, 1998 (NWA), Act No. 36 of 1998. Watercourse definitions used as part of the investigation include (NWA):
  - A river or spring.
  - A natural channel in which water flows regularly or intermittently.
  - A wetland, lake or dam into which, or from which, water flows.
- The description and classification of delineated wetlands areas into corresponding hydro-geomorphic (HGM) units according to Kotze et al. (2008).
- Present Ecological State assessment of identified watercourses within the site and wetlands located within a 500m radius of the property.
- Ecological Importance and Sensitivity (EIS) assessment of identified wetlands present within the study area.
- The identification of potential project-related impacts and the recommendation of appropriate mitigation measures.

9.5.1 Methodology

The methods and approaches that were applied as part of the wetland investigation included the following:

- Existing spatial datasets (National Freshwater Ecosystem Priority Areas, National Land Cover 2000 data set, The National Spatial Biodiversity Assessment, The Mpumalanga Biodiversity Conservation Plan) that indicate potential watercourses and ecologically important areas were used as part of an initial desktop approach,
- The wetland site survey consisted of three surveys on 6 & 28 August, 23 September and 8 November 2014.
- Watercourses were identified and delineated within the study area through the procedure described by the Department of Water and Sanitation
- Available wetland indicators were investigated
- the identification of hydromorphic features using a TLB to identify and delineated wetland areas

- The Present Ecological State (PES) of delineated wetland areas present within the study area was assessed according to the method developed by Kleynhans (DWAF 1999).
- An Ecological Importance and Sensitivity (EIS) assessment of identified natural wetland areas were undertaken to provide an indication of the conservation value and sensitivity of demarcated wetlands within this study area

9.5.2 Findings

Five (5) natural watercourses were identified and found onsite- two wetland areas (seep wetland and valley bottom wetland), riparian habitat and two ephemeral drainage line.

All watercourses were assessed in terms of their Present Ecological state (PES) and their Ecological Importance and Sensitivity (EIS). The PES method compares the current condition of a wetland, or other watercourse type, to its perceived reference condition, in order to determine the extent to which the watercourse had been modified from its pristine (reference) condition. The EIS assessment is undertaken to provide an indication of the conservation value and sensitivity of wetlands.

The results of these assessments are summarized in Table 1 below:

HGM wetland unit	Surface area	PES	EIS
Seep wetland (within the study area)	2.29 ha	C	High
Valley bottom wetland (channelled valley bottom wetland section within the study area)	1.02 ha	B	High
Riparian habitat	2.52 ha	B	High
Ephemeral drainage line 1 (within the study area)	0.10 ha	C/D	Low/marginal
Ephemeral drainage line 2 (entirely within the study area)	0.74 ha	B	High
32 m Buffer zone (within the study area)	10.30 ha	-	-
50 m Buffer zone (within the study area)	6.21 ha	-	-

9.5.3 Identified Impacts

Impacts identified include the following:

- Watercourse habitat loss and alien encroachment
- Erosion and sediment release in watercourses
- Change in wetland water quantity and quality inputs into watercourses

9.5.4 Recommendations

- In order to confirm the absence of plant species of conservation concern, it is recommended that, prior to any development of the remaining fragments of untransformed habitats within the study area an additional brief follow-up floristic survey should be conducted during the peak growing season (December to February) by the botanical specialist for this project. This survey should include searches for plant species of conservation concern within wetland habitats and other delineated watercourses, such as the riparian habitat.

- A buffer zone of 32 m is recommended for all of the watercourses, with the exception of the riparian habitat, for which a 50m buffer is recommended in line with recommendations for perennial rivers located outside the urban edge in other provinces, such as Gauteng (GDARD 2012)
- The development of an alien control plan

Please see Appendix D.5 for the full Wetland Impact Assessment Report. Please also refer to the Environmental Management Programme in Appendix F, which includes all mitigation recommended by the specialists as well as best practice in natural areas.

9.6. Hydrogeological Assessment

Paul and Partners appointed Geo - Logic Hydrogeological Consultants cc to do a Hydrogeological Investigation and Contamination Risk Assessment study for the site.

The scope of work associated with the Hydrogeological study includes the following:

- A desk study of existing information such as geological - and hydrogeological maps and existing borehole information.
- A hydro census of boreholes, rivers and streams, located around the development, to establish information such as static and dynamic water levels, borehole depths, water end users and river water quality if boreholes are available at or near the site.
- Study the ground water regime in terms of geology and related aquifers.
- Conduct borehole yield tests on the existing available production borehole or pit to be able to calculate the hydraulic parameters of the aquifer.
- Conduct double ring infiltrometer tests on the un-saturated aquifer to be able to evaluate the contamination risk on the proposed package plant development.
- Classify the groundwater occurrence at - and - in the vicinity of the site, according to Parson's rating system.
- Assess the contamination risk posed by the proposed development.
- Assess the risk of contamination by other sources.

9.6.1 Methodology

A desk study was performed to gather relevant geological and hydrogeological information. A hydro - census followed the desk study to establish borehole information in the region of the proposed development site on Portion 174 of the farm Goederede 60 JS.

The groundwater contours of the study area could not be constructed due to insufficient data available from boreholes. An attempt was made to understand the hydrogeology of the site and specifically the groundwater potential of the aquifer. Groundwater movement in the weathered aquifer layers can also be an indicator of the potential groundwater recharge of the site.

The groundwater recharge percentage and volumes was calculated with the groundwater recharge program of Professor Gerrit van Tonder from the University of the Free State.

The percolation rate test, geology, estimated water level depth and groundwater flow directions were utilized to calculate the contamination risk for the site.

9.6.2 Findings

The average recommended abstraction rates for the well was determined to be 69 kl/d.

Chemical water quality:

The fluoride level for the water from the well is above the standard limits, which mean that the water must be treated prior to human consumption. The standard limit for fluoride is 1.5mg/l. The fluoride level from the well is 8.13mg/l.

Bacteriological Water Quality:

The bacteriological count for the water well shows that the water does not need to be treated prior to human consumption. No filtration or chlorination is needed to treat the water for bacteria prior to human consumption.

The "Parsons Rating System" is an aquifer classification system developed to implement a strategy for managing groundwater quality in South Africa. Classification, vulnerability and susceptibility are rated for a specific aquifer to be studied. This system gives a classification on a regional scale, which normally is seen as such.

Aquifer Classification:

The aquifer at the proposed waste water treatment plant site is classed as a minor aquifer region and can be described as a low to moderately yielding aquifer system of variable water quality.

Aquifer vulnerability:

A least tendency or likelihood does exist for contamination to reach a specific position in the groundwater system after introduction at some location above the uppermost aquifer.

Aquifer susceptibility:

The aquifer is rated to have a low susceptibility. Susceptibility is a qualitative measure of the relative ease with which a groundwater body can be potentially contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification.

Groundwater Quality Management Classification:

The GQM index of this option is rated at 2, with a low protection level needed.

No existing boreholes could be found in a 1km area directly "down – stream" of the proposed development site that can be contaminated directly by accidental spills or leakages. No boreholes do exist in the area directly below the proposed development site and no groundwater abstraction takes place near the proposed development site.

9.6.3 Recommendations

The following mitigation measures are recommended:

- The water well should be properly sealed with a lockable lid to protect the water source from outside contamination.
- Water abstracted from the well should be treated by Reverse Osmoses prior to human consumption.
- All water retention structures, including storm water dams, retention ponds etc. should be constructed to have adequate freeboard to be able to contain water from 1:50 year rain events.
- The waste water package plant should be placed at least 100 m away from the nearest drainage feature.

See Appendix D.6 for the full Wetland Impact Assessment Report. Please also refer to the Environmental Management Programme in Appendix F, which includes all mitigation recommended by the specialists as well as best practice in natural areas.

9.7. Water Use Licence Application

Paul Odendaal, in his private capacity, has been appointed by NuLeaf Planning and Environmental to undertake the procurement of a Water Use Licence for Bhundu Inn Hotel.

The proposed project requires a Water Use License (WUL) in terms of Section 21 of the National Water Act of 1998 (Act No. 36 of 1998) (NWA). The process to be followed is in the form of a Water Use License Application (WULA).

Activities under Section 21 of the NWA that may be applicable to this development:

(a) Taking water from a water resource;
(b) Storing water
(e) Engaging in a controlled activity identified as such in Section 37(1) or declared under Section 38(1);
(f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; and
(g) Discharging of waste in a manner which may detrimentally impact on a water resource.

Section 37(1) of the NWA states that the following are considered as controlled activities which may be relevant to the present application:

(a) Irrigation of any land with waste or water containing waste generated through any industrial activity or by a waterwork.

Proof of application will be included in the Final Basic Assessment Report as Appendix D.8..

10. MITIGATION MEASURES RECOMMENDED BY SPECIALISTS

In order to minimise the impacts associated with the proposed development, the following mitigation measures have been identified for implementation: please do note, however, that these mitigation measures are from the Specialist Reports only and that additional Best practice measures will are included in the EMPr.

10.1. General: biodiversity

- In order to confirm the absence of plant species of conservation concern, it is recommended that, prior to any development of the remaining fragments of untransformed habitats within the study area, an additional brief follow-up floristic survey should be conducted during the peak growing season (December to February) by the botanical specialist for this project. This survey should include searches for plant species of conservation concern within wetland habitats and other delineated watercourses, such as the riparian habitat.
- In the event that the development of the study area is approved, permission for the removal of any recorded Declining species recorded during the recommended follow-up survey, should be obtained from the Mpumalanga Tourism & Parks Agency, and if necessary appropriate in situ and / or ex situ conservation measures should be developed and implemented in conjunction with the Mpumalanga Tourism & Parks Agency
- Any expansion into sensitive vegetation should only be considered after an assessment during the flowering period of threatened species that may occur on the site.
- No refuelling of heavy motorised vehicles (HMVs), stockpiling of material or the positioning of portable toilets should be allowed within any of the watercourses or their associated buffer zones.
- Stockpiles should be protected from erosion during the wet season to prevent sedimentation in watercourses.

10.2. Layout

- Areas that are already disturbed by existing infrastructure footprints should ideally be targeted for overlap with new infrastructure components that form part of the proposed development layout.
- Where the proposed infrastructure is situated south of the current transformed footprint, the layout should be reconsidered to provide an adequate buffer (50-100m) between the protected plant habitat on the boulder area south of the existing Bhundu Inn footprint.
- Retain all large trees and protected species as identified, and adapt the development footprint to accommodate these.

10.3. Sensitive Areas

- A buffer zone of 32 m is recommended for all of the watercourses, with the exception of the riparian habitat, for which a 50m buffer is recommended in line with recommendations for perennial rivers located outside the urban edge in other provinces.
- The *Spirostachys africana* (tamboti) stand be conserved as a unique feature.
- Buildings and other hardened surface infrastructure (including storm water attenuation measures) should be located outside of buffered watercourses. Delineated watercourses and buffers should consequently be treated as sensitive areas (no-go zone), with no manicured gardens to be implemented in either.

10.4. Alien Invasive Species

- An alien invasive control programme must be implemented and all invasive species removed under the guidance of an ECO.

10.5. Visual Impacts

- Break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Set back the lodge structures, and allow only viewing decks and low-key infrastructure in close proximity to the river edge.
- Make use of earth tones and natural materials rather than primary colours and high-tech finishes.
- Shield sources of light by physical barriers (walls, vegetation, or the structure itself);
- Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights;
- Make use of minimum lumen or wattage in fixtures;
- Make use of down-lighters, or shielded fixtures;
- Make use of Low Pressure Sodium lighting or other types of low impact lighting.
- Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

10.6. Cultural Heritage

- Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (cf. NHRA (Act No. 25 of 1999), Section 36 (6)).
- If any fossils are discovered during the construction then it is strongly recommended that a palaeontologist be called to assess their importance and rescue them if necessary.

10.7. Vegetation

- *Spirostachys africana* (tamboti) stand be conserved as a unique feature.
- Any expansion into sensitive vegetation should only be considered after an assessment during the flowering period of threatened species that may occur on the site (after sufficient rainfall).

10.8. Watercourse

- In order to confirm the absence of plant species of conservation concern, it is recommended that, prior to any development of the remaining fragments of untransformed habitats within the study area an additional brief follow-up floristic survey should be conducted during the peak growing season (December to February) by the botanical specialist for this project. This survey should include searches for plant species of conservation concern within wetland habitats and other delineated watercourses, such as the riparian habitat.
- A buffer zone of 32 m is recommended for all of the watercourses, with the exception of the riparian habitat, for which a 50m buffer is recommended in line with recommendations for perennial rivers located outside the urban edge in other provinces, such as Gauteng (GDARD 2012)
- The development of an alien control plan

11. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

NuLeaf Planning and Environmental were appointed to compile the Environmental Management Programme (EMPr) for the proposed expansion project.

An EMPr is defined as, 'A plan or programme that seeks to achieve a required end state and describes how activities that have or could have an adverse impact on the environment, will be mitigated, controlled, and monitored.'

The EMPr will identify all environmental impacts that may have the potential to arise during the design, construction and operational phases of the project. Mitigation measures will be proposed in order to avoid, reduce or minimize the effects that these impacts may have on the receiving environment. Cumulative impacts will also be addressed.

The EMPr will act as a 'guide' whereby the Contractor and all staff can refer to in the event of uncertainty to ensure that the correct practices and procedures are being adhered to.

The EMP is a dynamic and flexible document subject to review and updating. During the implementation of a project there is always the possibility that unforeseen issues could arise, this EMP should therefore be revised where necessary to mitigate unanticipated impacts.

Please refer to Appendix F for the detailed Draft EMPr.

12. ASSUMPTIONS AND LIMITATIONS

The Basic Assessment Report has been prepared on the strengths of the information available, including field surveys, specialist reports and information provided by the applicant at the time of the assessment. In addition, topographical and ecological maps were used. The assumptions made and constraints that were prevalent did not obviously have any restrictive or negative implications on the study.

In undertaking this investigation and compiling the Basic Assessment Report, the following has been assumed:

- The information provided by the client is accurate;
- The scope of this investigation is limited to assessing the environmental impacts associated with the construction and operation of the proposed holiday homes and associated infrastructure.
- Should the project be authorised, the applicant will implement any layout changes, recommendations and mitigation measures outlined in this assessment, EMP and authorisation into the detailed design and construction contract specifications of the proposed project.

13. EAP RECOMMENDATIONS

The proposed expansion of the Bhundu Inn Hotel will take place on already disturbed and transformed land with limited encroachment into areas of medium sensitivity and appropriate buffers around watercourses will be adhered to with exception of the buffer area around the rocky outcrop.

Based on the discussion in section 8.3, it is recommended that the expansion, as detailed in the Preferred Alternative (Alternative 1), be accepted due to the fact that all significant negative impacts can be mitigated and managed to an acceptable level. This is the alternative that successfully negates potentially harmful impacts, while maximising the potential of the proposed development to benefit the applicant, the guests and the local communities.

All mitigation measures detailed in the BAR, as well as, the Environmental Management Programme must be implemented and adhered to for the duration of both the construction and operational phases. Additionally, the following recommendations apply:

Recommendations for the Planning and Design Phase:

- An Ecologist should walk through the final site layout and identify and mark all protected plant and tree species. Every effort must be made to incorporate all trees into the design of the Hotel.
- Where the buildings are likely to affect an identified Protected Species, then the position of the building must be slightly adapted to ensure that the protected plant is not damaged or removed.
- Naturally emerging tamboti tree saplings must be left in place and protected.

Recommendations for the Construction Phase:

- A 'locals first' policy should be implemented where possible and local contractors should be appointed especially for low-skilled jobs.
- Contact numbers of all adjacent and neighbouring farms should be collected by the contractor so that in the event of a fire, they can be contacted.
- Alien plant species must be eradicated and follow up measures must be put in place to prevent the spread of these alien plants in the disturbed soils.
- Rehabilitation must be implemented after construction to ensure that all exposed areas around the units are re-vegetated with local endemic plant species, using the topsoil stockpiled. No alien vegetation is permitted.
- The storm water management plan as detailed in the EMPr must be implemented to avoid the pollution of the ephemeral drainage line, the wetlands and riparian habitat.
- An independent Environmental Control Officer must be appointed to oversee and audit the construction works.

Recommendations for the Operational Phase:

- All rehabilitated areas should be monitored for a year to ensure the re-establishment of vegetation and the prevention of erosion.
- Ensure facility sewage system is well maintained to prevent pollution of water and soil resources.
- Maintain the storm water management system to ensure that surface and runoff water from hard surfaces does not contribute to erosion and pollution.
- Implement an alien invasive monitoring programme to prevent the colonization and spreading of these species.

Assuming the above recommendations are implemented, there is no reason why the proposed expansion should not take place.

14. CONCLUSION

After careful review of the potential impacts associated with the proposed expansion of the Bhundu Inn Hotel, no fatal flaws associated with this project were found and the impacts with mitigation are not of a significant level of concern.

NuLeaf Planning and Environmental (Pty) Ltd see no reason why the expansion for the Preferred Alternative should not proceed and hereby recommend that the Department approve this Application for Environmental Authorisation.

It is, however, imperative, that all mitigation measures proposed in this report and the EMPr are implemented for the duration of the construction and operational phases.

APPENDIX A	MAPS

APPENDIX B SITE PHOTOGRAPHS

APPENDIX C FACILITY ILLUSTRATIONS

APPENDIX D SPECIALIST REPORTS

APPENDIX D.1 VEGETATION REPORT

APPENDIX D.2 PALEONTOLOGICAL REPORT

APPENDIX D.3 VISUAL REPORT

APPENDIX D.4 CULTURAL HERITAGE REPORT

APPENDIX D.5 WATERCOURSE REPORT

APPENDIX D.6 HYDROGEOLOGICAL REPORT

APPENDIX D.7 SERVICES REPORT

APPENDIX D.8 WATER USE LICENCE APPLICATION

APPENDIX E PUBLIC PARTICIPATION REPORT

APPENDIX F DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

APPENDIX G IMPACT TABLES