



ENVIRONMENTAL
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THE PROPOSED PROJECT FIFTY-EIGHT
DEVELOPMENT ON PORTION 58 OF THE FARM
KROMDRAAI 520 JQ
DEFF REF NO.2020-10-0029

DRAFT BASIC ASSESSMENT REPORT

APRIL 2021



THE PROPOSED PROJECT FIFTY-EIGHT DEVELOPMENT ON PORTION 58 OF THE FARM KROMDRAAI 520 JQ DRAFT BASIC ASSESSMENT REPORT

Prepared for:

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Submitted to:



**environment, forestry
& fisheries**

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EXECUTIVE SUMMARY

INTRODUCTION

Environmental Consultants International (Pty) Ltd (ECI) was appointed by Anderbridge Investments (Pty) Ltd (Proponent) as Environmental Assessment Practitioner (EAP) for the development of a tourism facility on Portion 58 of the Farm Kromdraai 520 JQ in the Cradle of Humankind, Mogale City Local Municipality, Gauteng. The property size is approximately 163.3 hectares (ha) in extent and the proposed development will have a maximum footprint of approximately 8.16 ha (therefore below 5% of the total property size).

The proposed retreat development will cater for a maximum of 150 guests at any given point and will consist of a hotel, an ashram sanctuary, a healing centre and a farming component.

A Basic Assessment Reporting process is followed in compliance with Sections 24(5) and 44 of the National Environmental Management Act (Act 107 of 1998) [NEMA]. The purpose of this Draft Basic Assessment Report (BAR) is to identify alternatives as well as the potential environmental impacts that may arise as a result of the proposed development and propose practical mitigation measures that can be implemented to reduce these impacts.

GENERAL PROJECT DESCRIPTION

The Proponent intends to construct a retreat on Portion 58 of the Farm Kromdraai 520 JQ in the Cradle of Humankind World Heritage Site (CHKWHS), Mogale City Local Municipality, Gauteng.

The proposed development includes scheduled activities under the 2014 EIA Regulations in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended (NEMA) resulting in the need for Environmental Authorisation (EA) from the DEFF.

Activities applied for under NEMA include **GN R No. 327 (Listing Notice 1, Activities 19 and 27) and GN R No. 324 (Listing Notice 3, Activities 4, 6, 12 and 14).**

ALTERNATIVES

Due to the lack of any other suitable land in the area, owned by the Applicant or available to the Applicant, no other site alternatives could be identified for the proposed development. Technology alternatives, however, will be explored for the proposed off-grid electricity supply i.e. Polycrystalline vs Concentrating Solar Power technology. The following 2 alternatives have been identified and assessed in this Draft BAR (in addition to the No-Go Alternative).

- **Alternative 1 – Proposed Activity** (utilising “Micromorph thin – film photovoltaic module” technology).
- **Alternative 2 – Technology Alternative** (utilising Concentrating Solar Power).

RISK AND KEY IMPACTS

Risks and key impacts have been identified in consultation with the Interested and Affected Parties (I&AP’s) and Stakeholders, during the notification phase. These impacts include:

Biophysical Impacts:

- Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage (*during the construction, operational phases*);
- Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste (*during the construction, operational phases*);
- Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surfaces (*during the construction and operational phases*);
- Potential impacts on vegetation and loss of habitat (*during the construction and operational phase*).
- Potential impacts on the availability of groundwater (*during the construction and operational phase*).

Socio-Economic Impacts:

- Impacts on ambient air quality dust and noise generation (*during the construction, operational phases*);
- Change in the visual character of the area (*during the construction, operational phases*);

- Potential impacts on existing cultural and heritage resources (*during the construction phase*);
- Potential impacts on traffic (*during the construction and operational phases*); and
- Economic development, tourism growth and job creation (*during the construction and operational phases*);

Cumulative Impact:

- Increased development on ridges in Gauteng and loss of sensitive vegetation and high biodiversity associated with ridges.

IMPACT EVALUATION

Each impact identified have been evaluated in terms of the most important parameters applicable to environmental management. These include the nature, extent, duration, intensity, probability and significance of the possible impact on the environment.

A variety of mitigation measures were identified that will serve to mitigate the scale, intensity, duration or significance of the impacts. These include guidelines to be applied during the construction and operational phases of the project. A detailed Environmental Management Plan (EMPr) has been included as part of this Draft BAR.

CONCLUSION

In conclusion, the Draft BAR established the scope of the Proposed Activity and Alternative and identified potential impacts on the receiving biophysical and social environments.

Comments and/or concerns identified by Interested and Affected Parties (I&APs) during the notification period have been incorporated in the Draft BAR. All comments received on the Draft BAR will be incorporated in the Final BAR which will made available simultaneously to registered I&AP's and DEFF for consideration. Further comments on the Final BAR will also be addressed and forwarded to DEFF.

The ability to mitigate identified impacts have been investigated in this Draft BAR and is also summarised into a working/ dynamic Environmental Management Programme (EMPr) for consideration by I&APs and the DEFF.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	iii
INTRODUCTION	iii
GENERAL PROJECT DESCRIPTION	iii
ALTERNATIVES	iv
RISK AND KEY IMPACTS.....	iv
IMPACT EVALUATION	v
CONCLUSION.....	v
TABLE OF CONTENTS	vi
ACRONYMS	ix
1. INTRODUCTION	1
1.1 BACKGROUND TO THE STUDY.....	1
1.2 ENVIRONMENTAL IMPACT ASSESSMENT	1
1.3 DRAFT BASIC ASSESSMENT PROCESS.....	2
1.3.1 SPECIALIST STUDIES	2
1.3.2 GAPS AND LIMITATIONS.....	3
1.3.3 NATURE AND STRUCTURE OF THIS REPORT.....	3
1.4 DETAILS AND EXPERTISE OF STUDY TEAM	7
1.4.1 EXPERTISE OF THE COMPANY	7
1.4.2 EXPERTISE OF THE EAP	8
1.4.3 DETAILS AND EXPERTISE OF THE SPECIALISTS	8
2. PROJECT DESCRIPTION.....	9
2.1 ACTIVITY LOCATION	9
2.2 PROPOSED ACTIVITY	10
2.3 SUSTAINABILITY	14
2.3.1 STABILISED RAMMED EARTH.....	14
2.3.2 AGROECOLOGY.....	16
2.4 ENGINEERING SERVICES	17
2.4.1 ELECTRICITY	17
2.4.2 WATER	18
2.4.3 SEWAGE	19
2.4.4 STORMWATER MANAGEMENT.....	21
3. POLICY AND LEGISLATIVE CONTEXT.....	22
3.1 RELEVANT ACTS AND REGULATIONS	22
3.1.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT, 1996 (ACT NO 108 OF 1996).....	22
3.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998) [NEMA]	22
3.1.3 THE NATIONAL WATER ACT 1998 (ACT NO 36 OF 1998) [NWA].....	25

3.1.4	NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004) [NEMBA].....	26
3.1.5	THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO. 25 OF 1999) [NHRA]	26
3.1.6	NATIONAL ENVIRONMENTAL MANAGEMENT PROTECTED AREAS ACT (NO 57 OF 2003) [NEM:PAA]	27
3.2	RELEVANT POLICIES AND GUIDELINES	28
3.2.1	DEPARTMENT OF ENVIRONMENTAL AFFAIRS INTEGRATED ENVIRONMENTAL MANAGEMENT GUIDELINES.....	28
3.2.2	ENVIRONMENTAL MANAGEMENT FRAMEWORK	28
3.2.3	MAGALIESBERG BIOSPHERE RESERVE	30
3.2.4	GAUTENG RIDGES POLICY.....	31
3.2.5	THE MOGALE CITY LOCAL MUNICIPALITY INTEGRATED DEVELOPMENT PLAN (IDP) 2016-2021 (2017/18).....	32
3.2.6	MOGALE CITY LOCAL MUNICIPALITY (MCLM) SPATIAL DEVELOPMENT FRAMEWORK (SDP) -2019/2024	33
4.	NEED AND DESIRABILITY	34
4.1	PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT.....	34
4.2	SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES	34
5.	PROJECT ALTERNATIVES	35
5.1	SITE ALTERNATIVES.....	36
5.2	LAND USE ALTERNATIVES	36
5.3	LAYOUT AND OPERATIONAL ALTERNATIVES.....	36
5.4	TECHNOLOGY ALTERNATIVES.....	36
5.5	ALTERNATIVES ASSESSED	37
5.5.1	ALTERNATIVE 1 – PROPOSED ACTIVITY.....	37
5.5.2	ALTERNATIVE 2 – TECHNOLOGY ALTERNATIVE	38
5.5.3	NO-GO ALTERNATIVE.....	39
6.	PUBLIC PARTICIPATION	39
6.1	NOTIFICATION OF INTERESTED AND AFFECTED PARTIES	40
6.2	DRAFT BASIC ASSESSMENT PHASE.....	40
6.3	STAKEHOLDER MEETINGS	40
7.	DESCRIPTION OF THE ENVIRONMENT	41
7.1	BIOPHYSICAL ENVIRONMENT	41
7.1.1	CURRENT LAND USE	41
7.1.2	CLIMATE	41
7.1.3	GEOLOGY	41
7.1.4	HYDROLOGY	43
7.1.5	GEOHYDROLOGY	44
7.1.6	ECOLOGY.....	46
7.2	SOCIAL ENVIRONMENT.....	56

7.2.1	SURROUNDING LAND USES	56
7.2.2	POPULATION	56
7.2.3	EDUCATION	57
7.2.4	SERVICES	57
7.2.5	EMPLOYMENT AND INCOME	58
7.2.6	SOCIO ECONOMIC CONCLUSION AND RECOMMENDATIONS	58
7.2.7	HERITAGE	59
7.2.8	VISUAL	62
7.2.9	AIR QUALITY	63
7.2.10	TRAFFIC	64
8.	IMPACT ASSESSMENT METHODOLOGY	66
8.1.1	ASSESSMENT CRITERIA	66
8.1.2	APPROACH TO THE ASSESSMENT OF CUMULATIVE IMPACTS	68
8.1.3	MITIGATION AND MANAGEMENT	68
8.2	ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)	68
9.	IDENTIFIED IMPACTS	69
9.1	POTENTIAL ENVIRONMENTAL ISSUES AND IMPACTS	69
9.1.1	BIOPHYSICAL IMPACTS	69
9.1.2	SOCIO-ECONOMIC IMPACTS	69
9.1.3	CUMULATIVE IMPACTS	70
9.2	ALTERNATIVES ASSESSED	70
9.2.1	MITIGATION AND MANAGEMENT	70
10.	IMPACT ASSESSMENT	71
10.1	CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)	72
10.3	OPERATIONAL PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)	85
10.5	CUMULATIVE IMPACT	89
11.	ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)	89
12.	EAP'S RECOMMENDATION	90
12.1.1	COMPARATIVE ASSESSMENT OF ALTERNATIVES	90
12.1.2	EAP'S STATEMENT	92
13.	CONCLUSION	93

ACRONYMS

AoI	Area of Influence
BAR	Basic Assessment Report
CA	Competent Authority
CRR	Comments and Responses Report
MCLM	Mogale City Local Municipality
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEFF	Department of Environment Forestry and Fisheries
DHSWS	Department of Human Settlements Water and Sanitation
EAP	Environmental Assessment Practitioner
ECI	Environmental Consultants International (Pty) Ltd
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EMZ	Environmental Management Zone
GNR	Government Notice Regulation
GDARD	Gauteng Department of Agriculture and Rural Development
ha	Hectares
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
MCLM	Mogale City Local Municipality
NEMA	National Environmental Management Act (Act No. 107 Of 1998)
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act
NHRA	The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	The National Water Act 1998 (Act No 36 of 1998)
PoS	Plan of Study
PPP	Public Participation Process
SDF	Spatial Development Framework
Sqm	Square Metres
WRDM	West Rand District Municipality
WULA	Water Use License Application

1. INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Environmental Consultants International (Pty) Ltd (ECI) was appointed by **Anderbridge Investments (Pty) Ltd** (Applicant) as Environmental Assessment Practitioner (EAP) for the development of a tourism facility on Portion 58 of the Farm Kromdraai 520 JQ in the core area of the Cradle of Humankind, Mogale City Local Municipality, Gauteng.

The property size is approximately 163.3 hectares (ha) in extent and the proposed development will have a maximum development footprint of approximately 8.16 ha (therefore below 5% of the total property size).

The Applicant aims to develop a world class authentic retreat that provides a platform for people to connect with themselves and their environment.

1.2 ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of Environmental Impact Assessment is to evaluate the impact of the proposed development on the receiving biophysical and social environments and to propose mitigation measures that can reduce these impacts once implemented in the planning, construction as well as the operational phases.

Environmental Impact Assessment is intended to be a systematic and consultative process that gathers comprehensive and detailed information on the social, economic and environmental consequences of proposed developments. The relevant competent authority - in this case the Department of Environmental, Forestry and Fisheries (DEFF) uses this information to make an informed decision on development applications that maximises socio-economic outcomes, whilst ensuring the continuance or improvement of ecological function.

The objective EIA, therefore, is to promote sustainable development through effective management of social, economic and environmental impacts, so that:

- Valuable environmental resources are safeguarded by avoiding negative irreversible changes;
- Human health and safety are protected; and
- The social and economic dimensions of the proposed development are enhanced.

The proposed development includes scheduled activities under the 2014 EIA Regulations in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) resulting in the need for Environmental Authorisation (EA) from the DEFF.

Proposed activities listed in terms of National Water Act, 1998 (Act 37 of 1998) (NWA) will require a Water Use License (WUL) to be administered by the Department of Human Settlements, Water and Sanitation (DHSWS).

1.3 DRAFT BASIC ASSESSMENT PROCESS

During the initial notification phase (**Thursday, 27 August 2020 to Monday 28 September**) all available information concerning the intended project and the receiving environment were identified and communicated in the form of Scoping Report. Interested and Affected parties (I&APs) were notified about the proposed project and their comments on issues of concern were invited.

An important output from the initial consultation with I&APs and Competent Authority is a clear understanding of the key issues that must be further addressed in the BAR phase. The notification phase therefore determines the terms of reference for any specialist studies required during the BAR phase to follow.

1.3.1 SPECIALIST STUDIES

The following specialist studies were deemed necessary and are included in this Draft BAR:

- Ecological Assessment (**Annexure F**)
- Wetland Assessment (**Annexure F**)
- Geotechnical Investigation (**Annexure D**)
- Traffic Impact Assessment (**Annexure D**)
- Heritage Impact Assessment (including Palaeontology) (**Annexure F**)
- Socio Economic Impact Assessment (**Annexure F**)

1.3.2 GAPS AND LIMITATIONS

Detailed Layout Plans and sections of the Proposed Activity are not available and the EAP had to rely on schematic drawings and conceptual perspectives. The Site Development Plan (**Figure 3**) is however logical and clear, and informs the spatial arrangement of the Proposed Activity adequately in the EAP's opinion. Should the DEFF require refinement of the SDP an updated version can be developed and submitted as part of the Final BAR.

1.3.3 NATURE AND STRUCTURE OF THIS REPORT

This report fulfils the requirements of Appendix 1 of GNR 326 of the 2014 EIA Regulations (as amended April 2017), which clearly specifies the required content of a Basic Assessment Report as summarised in **Table 1** below:

Table 1: GNR 326 Appendix 1 – Basic Assessment Reporting Requirements

No.	Requirement	Reference
2(a)	Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context.	Section 3
2(b)	Identify the alternatives considered, including the activity, location, and technology alternatives.	Section 5
2(c)	Describe the need and desirability of the proposed alternatives.	Section 4
2(d)	Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on degerming the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine- <ul style="list-style-type: none"> (i) the nature, significance, consequence, extent, duration and probability of the impacts occurring to; and (ii) the degree to which these impacts— <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; and (dd) through a ranking of the site sensitivities and possible impacts the activity. 	Section 10
2(e)	Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to— <ul style="list-style-type: none"> (i) identify and motivate a preferred site, activity and technology alternative; 	Section 12

No.	Requirement	Reference
	<ul style="list-style-type: none"> (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored. 	
3(1)(a)	<p>A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—</p> <p>details of—</p> <ul style="list-style-type: none"> (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae. 	Section 1.4 and Annexure G
3(1)(b)	<p>The location of the activity, including:</p> <ul style="list-style-type: none"> (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties. 	Section 2
3(1)(c)	<p>A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is—</p> <ul style="list-style-type: none"> (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken. 	Figure 1
3(1)(d)	<p>A description of the scope of the proposed activity, including—</p> <ul style="list-style-type: none"> (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure. 	Table 3
3(1)(e)	<p>A description of the policy and legislative context within which the development is proposed including—</p> <ul style="list-style-type: none"> (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments. 	Section 5
3(1)(f)	<p>A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.</p>	Section 4
3(1)(g)	<p>A motivation for the preferred site, activity and technology alternative.</p>	Section 12

No.	Requirement	Reference
3(1)(h)	<p>A full description of the process followed to reach the proposed preferred alternative within the site, including—</p> <ul style="list-style-type: none"> (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity. 	Section 6 and Section 12
3(1)(i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including—</p> <ul style="list-style-type: none"> (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures. 	Section 10 Section 12

No.	Requirement	Reference
3(1)(j)	An assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring;	Section 10
3(1)(k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 10
3(1)(l)	An environmental impact statement which contains— (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 12
3(1)(m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	Section 11 and Annexure H
3(1)(n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 12
3(1)(o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 1
3(1)(p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 12
3(1)(q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	N/A

No.	Requirement	Reference
3(1)(r)	An undertaking under oath or affirmation by the EAP in relation to— (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Application Form
3(1)(s)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	N/A
3(1)(t)	Any specific information that may be required by the competent authority; and	To be included in the Final BAR
3(1)(u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	To be included in the Final BAR
3(2)	Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	To be included in the Final BAR

1.4 DETAILS AND EXPERTISE OF STUDY TEAM

Refer to **Annexure G** for CV's and Qualifications of the EAP. CV's and signed declarations of the entire Study Team will be included in the Final Basic Assessment Report.

1.4.1 EXPERTISE OF THE COMPANY

The consultants of ECI have been providing environmental management services in the following areas since 1991:

- Strategic Assessment and Planning
- Site selection and Due Diligence
- Landscape Architecture
- Land Management Plans
- Environmental and Social Impact Assessment
- Licensing Applications

- Biodiversity Assessments
- Monitoring and Auditing
- Public Consultation and Stakeholder Engagement
- Peer Reviews
- Environmental Advisory Services

1.4.2 EXPERTISE OF THE EAP

Mr Dave Rudolph

Dave Rudolph has 27 years of experience in the field of environmental management and resource planning. The experience relates to large scale spatial planning and assessment initiatives at a National, Provincial and Local level. He has managed numerous large-scale Environmental Assessment both Nationally and Internationally.

Ms Hanlie Van Greunen

Hanlie Van Greunen has a BSc degree in Landscape Architecture and a BSc Honours degree in Environmental Monitoring and Modelling and is a member of the International Association for Impact Assessment of South Africa (IAIAsa Member 6022). With 14 years' experience in the environmental industry her key performance areas include Environmental Licensing (Basic Assessment, Scoping and EIA, Water Use License Application, Waste Management Application, Air Emission License Application), Environmental Compliance Auditing, Visual Impact Assessment and Project Management.

1.4.3 DETAILS AND EXPERTISE OF THE SPECIALISTS

Albert van Eeden (Ecology)

Albert van Eeden has MSc degree in Water Resource Management and 6 years of experience in the environmental, agricultural and urban development fields. In the environmental sphere the experience relates to environmental research, field surveys, data gathering, data management, community engagement, rehabilitation projects, water quality monitoring and wetland assessments.

Leoni Marais (Heritage and Palaeontology)

Leonie has a BSc Hons degree in Cultural History and a Post Grad Diploma in Heritage Studies. With 29 years of experience in the Heritage field Leoni's key experience is in Section 38 and 34 Heritage Impact Assessment Applications, General Heritage Management and Public Participation.

Jessica Edwards (Social Specialist)

Jessica Edwards is Senior Social Consultant with over 17 years of experience in social research and community participation processes. She holds a Masters Degree in Environment and Society from the University of Pretoria, completing a mini-dissertation on: "*Competing Values in the Integrated Environmental Management Process ~ Understanding the Dynamics Between Evidence Versus Value-Based Decision-Making*". She presented her findings at the 38th Annual Conference of the International Association for Impact Assessment. She has completed over 40 Social Impact Assessment Reports, of which almost 15 formed part of Socio-Economic Impact Assessments. She has a good understanding of Environmental Legislation, working mainly with the National Environmental Management Act No. 107 of 1998 and the Mineral and Petroleum Resources Development Act No. 28 of 2002 in South Africa.

2. PROJECT DESCRIPTION

2.1 ACTIVITY LOCATION

The proposed development is located on Portion 58 of the Farm Kromdraai 520 JQ (21-digit SG code: T0JQ0000000005200058) within the core of the Cradle of Humankind World Heritage Site (CHKWHS), Mogale City Local Municipality, Gauteng.

The site is located approximately 10 km north of Krugersdorp and to the south-east of the intersection between roads R540 and R374. **Figure 1** indicates the location of the proposed site in relation to nearby roads and urban areas (Refer to **Annexure A** for A3 size map).

Photographs of the proposed site are included in **Figure 2** (Refer to **Annexure B** for A3 size).

The property is predominantly empty; there are existing dams and dam foundations dotted around the site, there is also a small farmhouse and outbuildings. All existing structures will be renovated and incorporated into the Proposed Activity.

2.2 PROPOSED ACTIVITY

Project Fifty-Eight aims to develop a tourism facility on Portion 58 of the Farm Kromdraai 520 JQ. The proposed facility can be defined as “a place to restore conscious appreciation for life in all its manifestations and create a model for a regenerative society”. The facility will consist of the following components and will be able to accommodate a maximum of 150 guests:

- Six (6) 275 m² residential villas;
- Sixteen (16) 175 m² residential villas;
- Eighteen (18) 65 m² residential suites;
- Nineteen (19) 40 m² residential rooms;
- Six (6) 10 m² residential pods;
- 200 m² wellbeing facility (incl. hydrotherapy, treatments rooms and a gym);
- 600 m² 23-room residency;
- 550 m² lounge/event space;
- 200 m² restaurant, and
- 520 m² central facilities

Refer to **Figure 3** for the proposed Layout Plan (Refer to **Annexure C** for an A3 size plan).

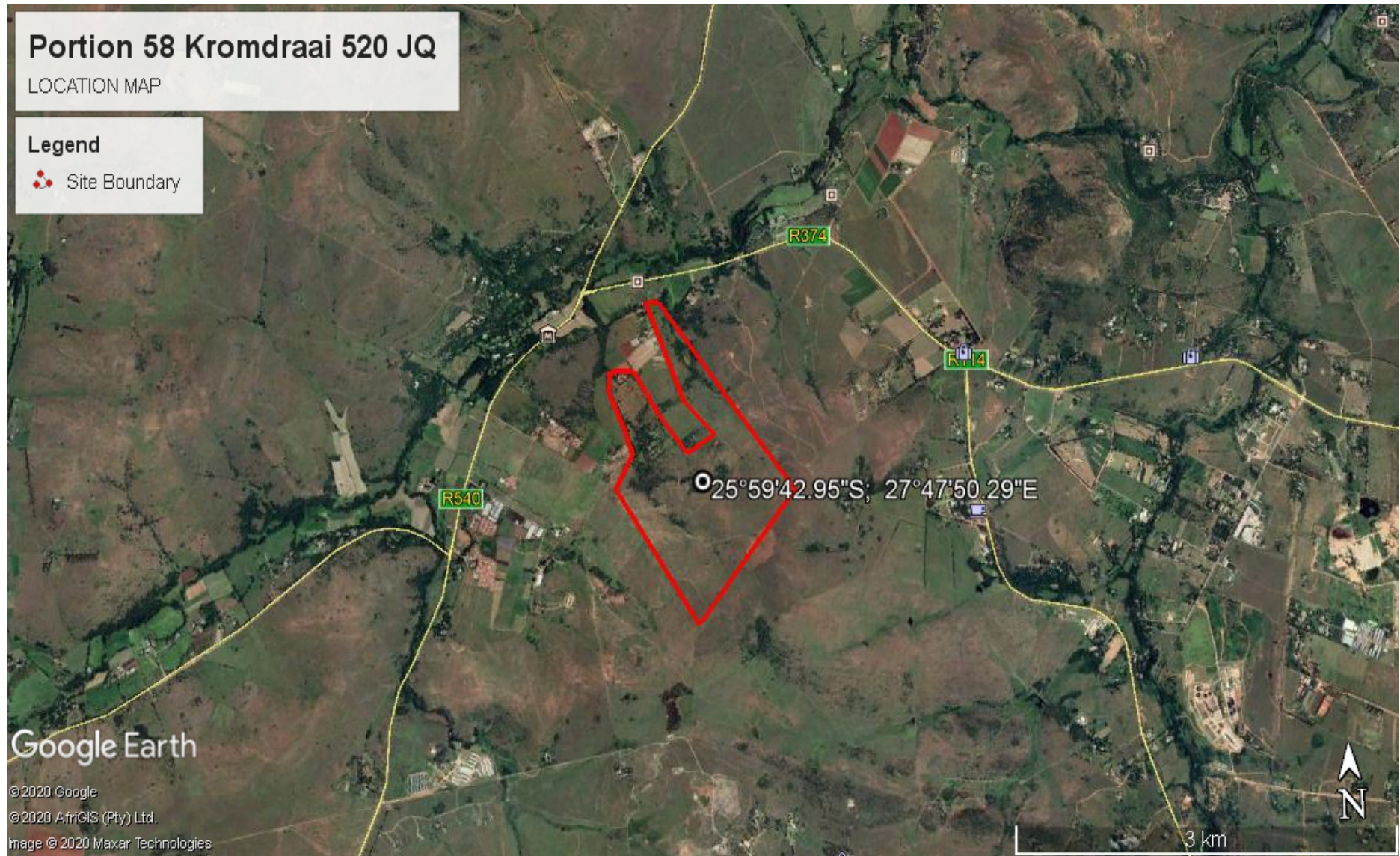


Figure 1: Location of the proposed development



Figure 2: Site Photographs

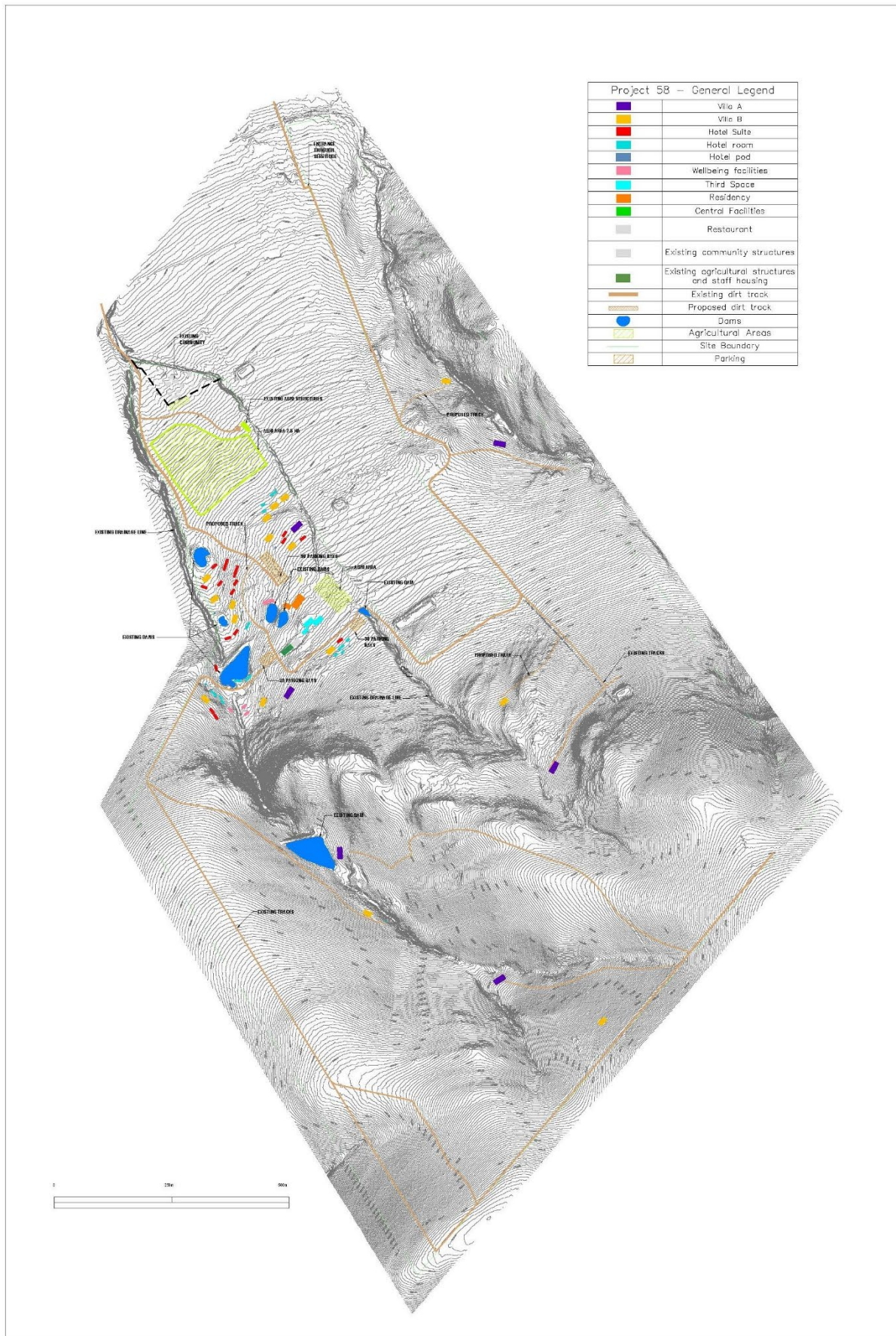


Figure 3: Proposed Layout Plan

2.3 SUSTAINABILITY

The proposed property is north facing and well located on a slight elevation allowing for views across the Kromdraai Valley, and is a total of 163.3 hectares. On the high point of the site is a waterfall which leads into a stream that flows through the site into the dam below. The rising gradient of the site lends itself to the development of separate structures which will be positioned in such a manner as to allow for privacy and quiet spaces.

The Proposed Activity will utilise environmentally responsible materials, employing sustainable building techniques and avoiding reliance on non-renewable resources. Sustainable practices that will be implemented as part of the Proposed Activity includes:

- Water conservation;
- Rainwater harvesting and water recycling;
- Utilising green materials (see section 2.3.1 below);
- Green energy (solar);
- Recycling;
- Composting; and
- Agroecology (see section 2.3.1 below)

Refer to **Figure 4** for conceptual perspectives of the proposed facilities.

2.3.1 STABILISED RAMMED EARTH

By using local materials and low-carbon techniques such as stabilised rammed earth, the Proposed Activity aims to reduce the carbon footprint by 70% compared to conventional bricks and 50% compared to concrete. Besides initial saving on embodied carbon and energy, this approach offers energy and cost-savings for generations to come, thanks to its high thermal mass. All while creating a healthy indoor environment, free from toxins and chemicals that have become so common in modern building materials.

Refer to **Figure 5** for an example of the proposed rammed earth building technique.

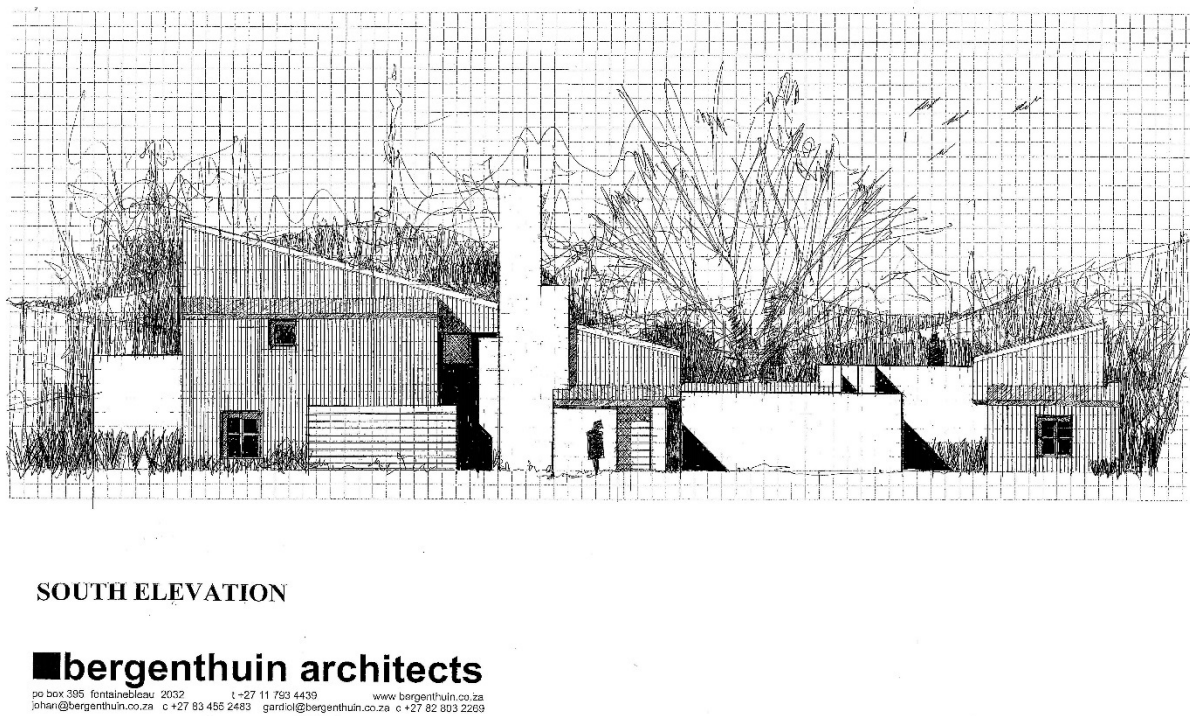
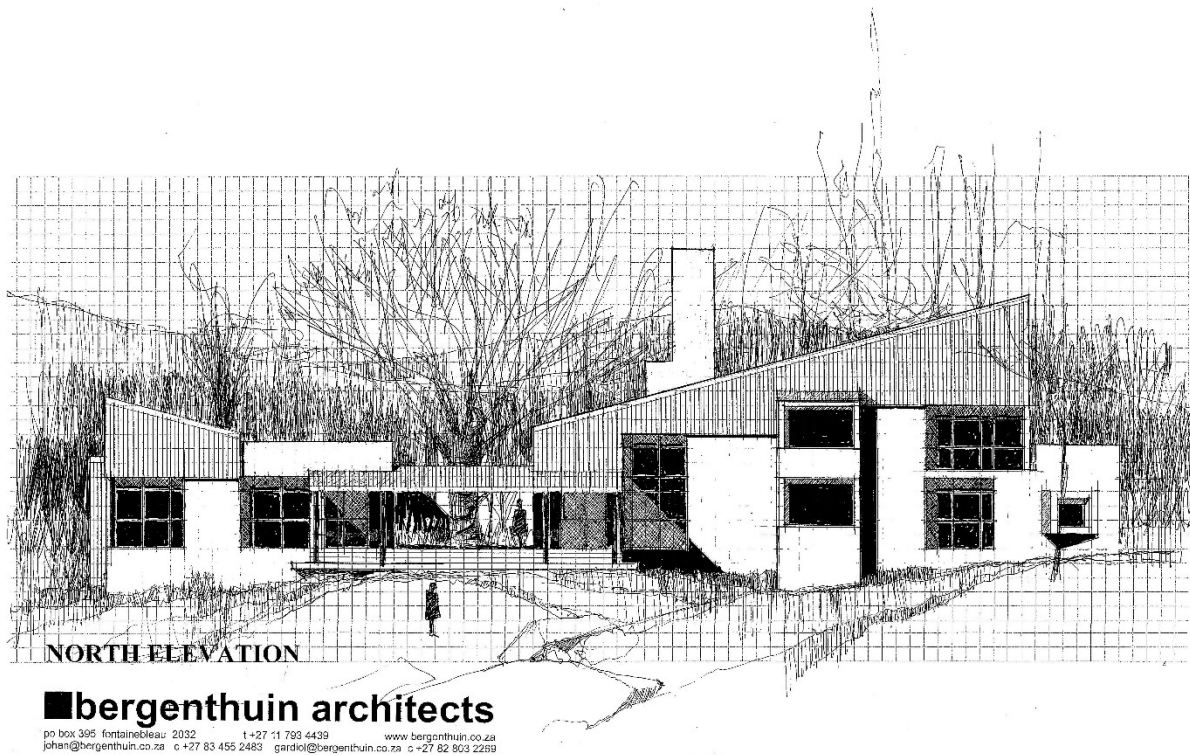


Figure 4: Conceptual perspectives of proposed facilities



Figure 5: Proposed rammed earth building technique

2.3.2 AGROECOLOGY

The Proposed Activity will host an organic restaurant with two very different dining experiences that sources only from local farmers as well as from the agroecological farm found located on the proposed property. The first, immerses the visitor in a dining experience amongst freshly grown produce which will be served at the restaurant. The second engages and demonstrates the preparation and storage of the produce and food as an important aspect of nourishment as a dining experience. Refer to **Figure 6** for an artist impression of the agroecology facility.



Figure 6: Artist impression of the proposed Agroecology Facility

2.4 ENGINEERING SERVICES

Refer to **Annexure D** for Engineering Services Reports as outlined below:

2.4.1 ELECTRICITY

Given this and the ecological objectives of the development, the Development will adopt the following measures within its design.

- Gas powered cooking equipment and geysers.
- No artificial pools and associated pumping equipment.
- No usage of artificial temperature control.
- Appliances and lighting selected for energy efficiency across the development.
- Thermal insulation and natural ventilation.
- Use of metering to monitor energy consumption across the development and identify inefficiencies during operation.
- Correct building orientation and roof overhang design to maximise solar thermal energy gain in winter and minimise solar energy gain in summer.

Electricity is currently supplied to the farm directly by Eskom. The farmstead and worker's houses are currently serviced by an 11kV bulk overhead supply line, which has two three phase transformers. The southernmost feeds an 80A circuit breaker, the northernmost feeds a 60A circuit breaker.

In addition to the Eskom electricity the development will be serviced primarily by energy generated by solar PV cells. The total roof area of the planned development is 8250m². Utilising 50% of this space for solar PV generation (excluding spacing between panels and racks) would allow for 742kwp of generation potential using 360wp panels. An installation of this size would generate 1,285 MWh power per year.

The proposed development will therefore not result in any additional demands on national or local electrical infrastructure. The development has sufficient space to generate and store enough solar energy for its needs.

Refer to **Annexure D** for the complete Electrical Report.

2.4.2 WATER

The existing buildings on site are being supplied with potable water from five boreholes on site. The boreholes were tested and provided yields as outlined in **Table 2** below.

Table 2: Existing borehole yields

Borehole Number	Flow Rate (KL/Day)
1	60
2	12
3	100.8
4	7.2
5	115.2
Total	295.2

The estimated water demand for the proposed project was calculated using the Red Book General Design Guidelines and equated to **265.38 KL/Day**.

Understanding that the municipality is not able to provide potable water to the site, it is proposed the available groundwater be utilised as the main source for the proposed development.

Sustainable practices such as rainwater harvesting, attenuation, and water recycling will be implemented in order to reduce the estimated demand as much as possible.

Rainwater harvesting can also take place from surface run-off and the attenuation ponds can also be utilized as detention or storage facilities. This can be an additional source of water to supplement supply. Rainwater harvesting from rooftops is restricted to the area of roofs whereas surface run-off will provide much more water to supplement the main source (groundwater).

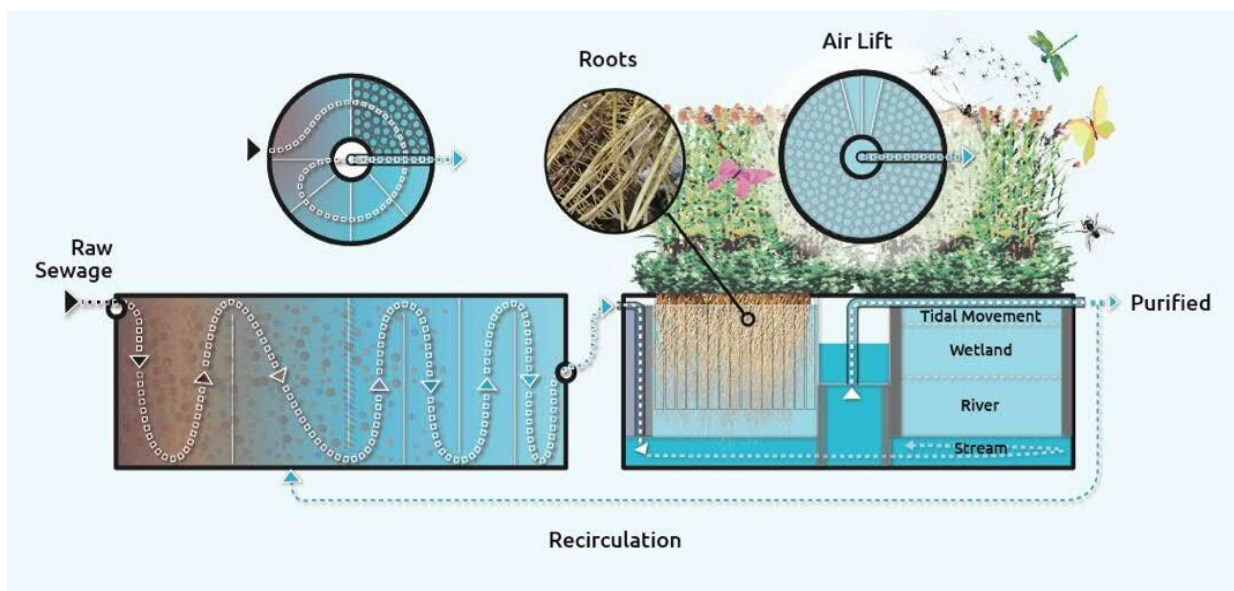
Groundwater monitoring (yield and quality) of the five existing boreholes will be carried out on a quarterly basis during the operational period. If the yield reduces dramatically a new water resource will be secured.

Refer to **Annexure D** for the Water and Sanitation Report.

2.4.3 SEWAGE

As the proposed project needs to be self-sufficient (due to a lack of bulk municipal infrastructure) the implementation of a Waste Water Treatment Package Plant (WWTPP) is required in order to sufficiently treat total sewage demand of 60 Kl/day. The proposed system to be utilised by the project was developed by AsaDuru, and is called the TreeWell.

A TreeWell is a biomimetic wastewater treatment system which optimises and condense natural processes of decomposition and metabolism to treat wastewater. A standard module consists of two tanks, one aerobic and one anaerobic, taking up as little as 9m². A schematic diagram is shown below:



Treatment phases:

1. Pollutants found in the wastewater are broken down and metabolised by microbes, which are then in turn consumed by larger organisms in the constructed microbial 'food web'. This process continues up the trophic levels of the constructed ecosystem until small insect larvae in the roof of the second tank allow biomass to exit the system.
2. The second tank is open, with plants growing in the roof. The plants absorb some of the pollutants contained in the wastewater as well as the plant root zone providing optimum conditions for the microbial interactions which drive the system to take place.

3. The use of these biological processes allows for a treatment which leaves no residual sludge – unlike practically all other wastewater treatment systems. As a result, the TreeWell has a very low maintenance burden. The system can be customised to treat water from different waste flows and to meet requirements for discharged water.

It is proposed that the TreeWells are located where they can serve individual buildings or a cluster of buildings. Each TreeWell can process up to 25kl of wastewater a day and will not be connected to a building or a building cluster that has throughput capacity of over 25kl/day. This means that at least five Treewells will be installed for the development at full capacity.

The TreeWells take up approximately 9m² and will be no closer than 3m to the building footprint. The location of the TreeWells will minimise extensive pipework over a sparsely populated area. Refer to **Figure 7** for examples of installed TreeWells.



Figure 7: Examples of installed TreeWells

Effluent from TreeWells will be used for site irrigation with the excess effluent to be discharged into the natural drainage channel/watercourse on the western side of the property which feeds into the Bloubankspruit.

This activity is a listed activity in terms of the Section 21(f) and (21g) of the National Water Act, 1998 (Act 36 of 1998) and will be included in the Water Use Licence Application to be administered by the Department of Human Settlements, Water and Sanitation.

It is proposed that the TreeWells for the proposed Project 58 be designed by Asaduru for the various locations and sizing requirements and a separate Sewer Package Plant Design Report be submitted to MCLM for scrutiny and approval.

Refer to **Annexure D** for the Draft Water and Sanitation Report.

2.4.4 STORMWATER MANAGEMENT

The proposed development is divided into three drainage areas. Two drainage areas join together within the site, one comes across from the eastern neighbouring property and all drain to the Bloubankspruit River to the north of the development.

The general drainage pattern for the site is from the southeast to the northwest, the two joined drainage areas have an average slope of 8.1% and the eastern drainage area has an average slope of 9.1%. The internal stormwater system will make provision for a 1:5 year flood return period (minor storm) and a 1:25 year flood return period for the major systems.

The total volume of 7 794m³ of the run-off generated by the proposed development will have to be attenuated before releasing the stormwater into the existing systems of the existing watercourse. The stormwater outlet structures will include energy dissipation measures at the various outlets to minimize the possibility of erosion at the point of discharge.

Stormwater runoff from the various areas of the development will be conveyed by an open channel system alongside all internal roads, with sections of underground piping. The discharge will be into attenuation ponds. All of the major rooftops of the proposed development will be utilised for rainwater harvesting and will not contribute to surface runoff. The harvested water will be treated and recycled for potable water use and irrigation.

Stormwater will be accommodated on the roads as far as possible. However, when the road cannot accommodate the flow, stormwater will be diverted off the road into grass-lined channels (on flat roads, <2%) or concrete-lined channels (on steep roads, >2%) alongside the road. At regular intervals, a grid-inlet will divert the flow and stormwater run-off under the road and released downslope on the road. Grid inlets will be positioned and sized to suit the expected run-off and will vary in size.

A Stormwater Management Plan in line with the sustainable urban design standards (SUDS) must be approved by Mogale City Local Municipality (MCLM) and implemented during the construction and operational phases of the project

Refer to **Annexure D** for the complete Roads and Stormwater Report.

3. POLICY AND LEGISLATIVE CONTEXT

3.1 RELEVANT ACTS AND REGULATIONS

3.1.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT, 1996 (ACT NO 108 OF 1996)

Section 24 of the Constitution of South Africa No. 108 of 1996 states that “...everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (c) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.” This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development. The proposed project will ensure of such rights.

3.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998) [NEMA]

The National Environmental Management Act (Act No. 107 of 1998) (NEMA) provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the State, as well as to provide for matters connected therewith.

Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment. These include the following:

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

Section 28(1) states that: “Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring.” If such degradation/pollution

cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

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

The proposed development includes activities that fall within the scheduled activities under the Environmental Impact Assessment (EIA) Regulations 2014 in Listing Notices 1 and 3 and published in Government Notices No. R. 327 and 324, respectively.

Applicable listed activities and their relevance in terms of the proposed development are outlined in **Table 3** below:

Table 3: Applicable listed activities under the EIA Regulations 2014

Government Notice Number and Date	Activity in terms of Government Notice	Project Relevance
GNR 327 of April 2017 Listing Notice 1	<u>Activity 19</u> The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	Earthworks at dams, water crossings and stormwater structures will excavate / infill in the excess of 10m ³ from / into the watercourses on site.
GNR 325 of April 2017 Listing Notice 1	<u>Activity 27</u> The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The total footprint of the project will be 8.16 hectares which will require clearance of areas of Andesite Mountain Bushveld and Egoli Granite Grassland (greater than 1 hectare)

Government Notice Number and Date	Activity in terms of Government Notice	Project Relevance
<p>GNR 324 of April 2017 Listing Notice 3</p>	<p><u>Activity 4</u> The development of a road wider than 4 metres with a reserve less than 13,5 metres. c) In Gauteng: iv. Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans.</p>	<p>Proposed internal roads will be 3 to 7 meters wide.</p>
<p>GNR 324 of April 2017 Listing Notice 3</p>	<p><u>Activity 6</u> The development of resorts, lodges, hotels, tourism or hospitality facilities that sleeps 15 people or more. c) In Gauteng: iv. Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans.</p>	<p>The proposed facility will accommodate a maximum of 150 guests.</p>
<p>GNR 324 of April 2017 Listing Notice 3</p>	<p><u>Activity 12</u> The clearance of an area of 300 square metres or more of indigenous vegetation. c) In Gauteng: iv. Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans.</p>	<p>The total footprint of the project will be 8.16 hectares which will require clearance of areas of Andesite Mountain Bushveld and Egoli Granite Grassland (greater than 300m²).</p>
<p>GNR 324 of April 2017 Listing Notice 3</p>	<p><u>Activity 14</u> The development of infrastructure or structures with a</p>	<p>Recreational structures and stormwater structures will have a footprint greater than 10m².</p>

Government Notice Number and Date	Activity in terms of Government Notice	Project Relevance
	<p>physical footprint of 10 square metres or more; where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>c) In Gauteng:</p> <p>iv. Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans.</p>	

3.1.3 THE NATIONAL WATER ACT 1998 (ACT NO 36 OF 1998) [NWA]

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

The following water use activities listed in terms of Section 21 of the NWA will need to be registered with the Department of Human Settlements, Water and Sanitation.

- S21(a) Taking water from a water resource (Boreholes), and
- S21(b) Storing water (Dams), and

- S21(c) Impeding or diverting the flow of water in a watercourse (all activities within 500m of watercourse), and
- (e) Engaging in a controlled activity defined as such in Section 37(1), (irrigation with treated water),
- S21(f) – discharging waste or water containing waste into a water resource through a pipe, canal or other conduit, and
- S21(g) – disposing of waste in a manner which may detrimentally impact on a water resource, and
- S21(i) Altering the bed, banks, course or characteristics of a watercourse.

3.1.4 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004) [NEMBA]

The purpose of NEMBA is to provide for the management and conservation of South Africa's biodiversity within the framework of the 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.

The fauna and flora prevailing in the study area will be handled in terms of the NEMBA as amended, including all the pieces of legislation published in terms of this act.

3.1.5 THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO. 25 OF 1999) [NHRA]

The NHRA legislates the necessity for Heritage Impact Assessment (HIA) in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. The Competent Authority for projects in the CHKWHS is the South African Heritage Resources Authority (SAHRA) and Section 38 approval in terms of the NHRA must be obtained from SAHRA prior to commencement.

The HIA and EMPr must outline the correct procedures to be followed should features, sites or artefacts of cultural significance that could be impacted on by the proposed development be identified during construction.

3.1.6 NATIONAL ENVIRONMENTAL MANAGEMENT PROTECTED AREAS ACT (NO 57 OF 2003) [NEM:PAA]

NEM:PAAT aims to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; and for matters in connection therewith.

The purpose of this Act is to provide for the:

- Protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes;
- Establishment of a national register of all national, provincial and local protected areas;
- Management of those areas in accordance with national norms and standards;
- Intergovernmental co-operation and public consultation in matters concerning protected areas

Section 50 Approval in terms of NEM:PAA

“(1) The management authority of a nature reserve and world heritage site may, despite any regulation or by-law referred to in section 49, but subject to the management plan of the reserve or site-

(a) carry out or allow-

(i) a commercial activity in the reserve or site; or

(ii) an activity in the reserve or site aimed at raising revenue;

(b) enter into a written agreement with a local community inside or adjacent to the reserve or site to allow members of the community to use in a sustainable manner biological resources in the reserve or site; and

(c) set norms and standards for any activity allowed in terms of paragraph (a) or (b).

(2) An activity allowed in terms of subsection (1) (a) or (b) may not negatively affect the survival of any species in or significantly disrupt the integrity of the ecological systems of the nature reserve or world heritage site. establish systems to monitor-

(3) The management authority of the nature reserve or world heritage site must

(a) the impact of activities allowed in terms of subsection (1)(a) or (b) on the

(b) compliance with reserve or site and its biodiversity; and

(i) any agreement entered into in terms of subsection (1)(b); and

(ii) any norms and standards set in terms of subsection (l)(c).

(4) Any activity carried out lawfully in terms of any agreement which exists when this section takes effect may continue until the date of termination of such agreement, provided that the agreement may not be extended or varied so as to expire after the original tended expiry date without the consent of the Minister.

(5) No development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority”

In order to give effect to Section 50 of NEM:PAA the Applicant have to obtain approval from the CHKWHS Management Authority for the proposed project.

3.2 RELEVANT POLICIES AND GUIDELINES

3.2.1 DEPARTMENT OF ENVIRONMENTAL AFFAIRS INTEGRATED ENVIRONMENTAL MANAGEMENT GUIDELINES

Integrated Environmental Management (IEM) is a philosophy, which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development. IEM is a philosophy, which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (Department of Environmental Affairs: DEAT, 2004). The IEM guidelines intend endearing a pro-active approach to sourcing, collating and presenting information at a level that can be interpreted at all levels.

3.2.2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

The Gauteng Provincial Environmental Management Framework (EMF) is legal instruments in terms of the Environmental Management Framework Regulations, 2010. (<http://www.DEA.gpg.gov.za>). The purpose of the regulations is to assist environmental impact management including S&EIA processes, spatial planning and sustainable development.

The Gauteng EMF is divided into five Environmental Management Zones (EMZ) based on sensitivity and a number of Special Control Zones (SCZ) with specific management guidelines that have to be followed. The Cradle of Humankind World Heritage Site (CHKWHS) is one of the Special Control Zones outlined in the Gauteng EMF and is divided further into (a) the

Primary Zone (b) the Buffer Zone (c) Secondary Zone 1 and (d) Secondary Zone 2 (Refer to Figure 8).

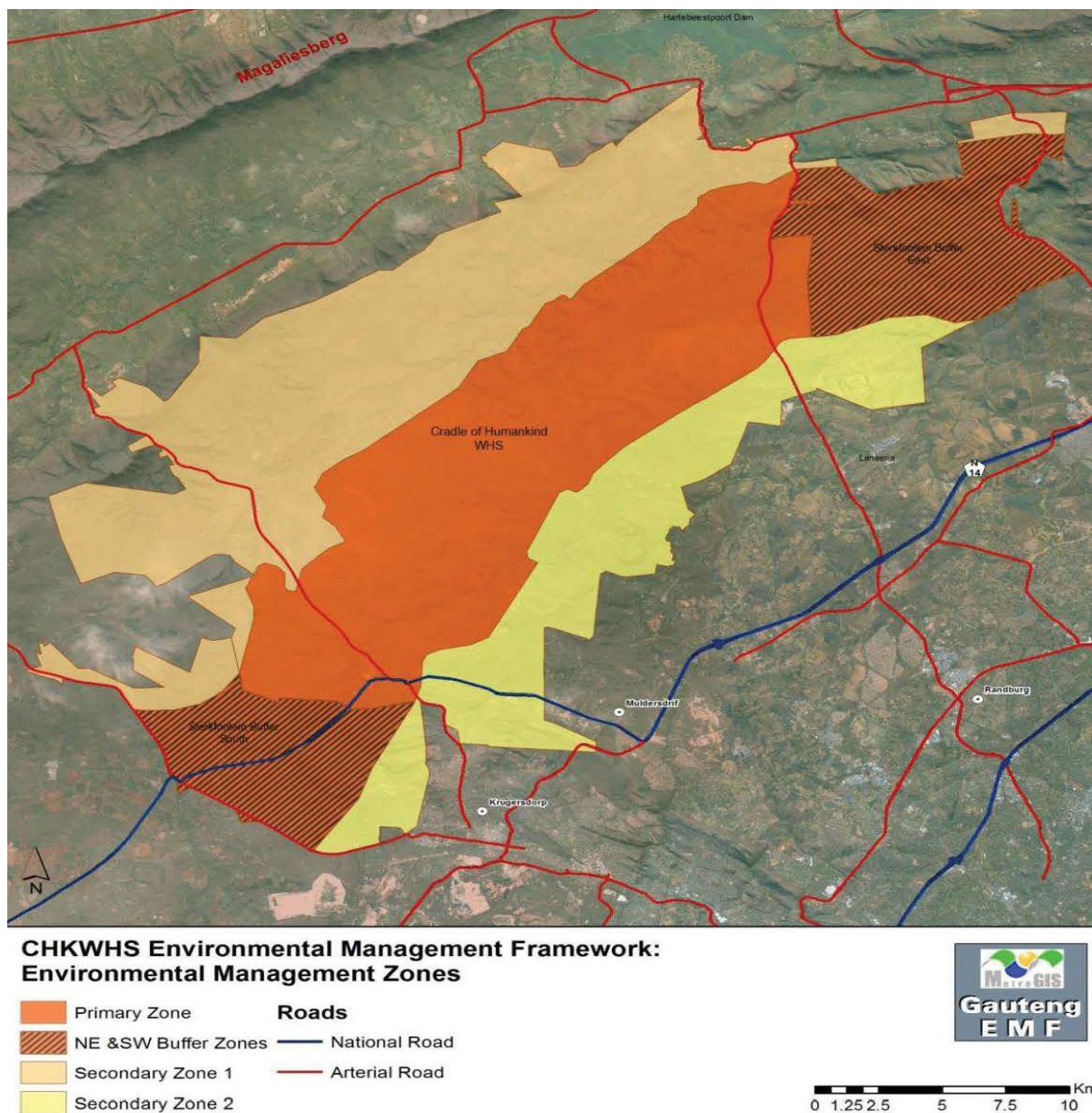


Figure 8: CHKWHS Environmental Management Zones, Gauteng EMF

The Proposed Activity falls within Primary Management Zone of the CHKWHS Special Control Zone. According the Gauteng EMF:

“the Primary Zone is considered the most important zone in terms of the outstanding universal value of the CHKWHS. This zone represents the extent of the fossil bearing dolomitic limestone features and caves and Karst system that extends beyond the boundary of the existing proclaimed WHS and originally proposed buffer zone (2008). These physical features

and resulted landscapes define geographically as the most important primary natural elements of the CHKWHS. The need to protect and preserve the integrity of this zone is without doubt the prime management responsibility of the Management Authority in terms of its mandate to protect, preserve and present these elements”

Desirable development activities for the Primary Zone of the CHKWHS Special Control Zone includes boutique hotels and lodges as well as tourism incentive accommodation. The Proposed Activity falls within this category and is therefore in line with the GPEMF.

3.2.3 MAGALIESBERG BIOSPHERE RESERVE

The Proposed Activity is located in the Magaliesberg Biosphere Reserve (MBR) which was proclaimed an international Biosphere Reserve by UNESCO on 9 June 2015, having been recognised for its exceptional natural, cultural and human characteristics.

The Magaliesberg Biosphere is 360 000 hectares, and extends approximately 120 km west to east across the boundary of the North West and Gauteng Provinces of South Africa, spanning the Magaliesberg Mountains between the cities of Rustenburg in the west and Pretoria in the east. Refer to **Figure 9**.

Being the meeting point of three different kinds of biomes; the central grassland plateaux, the sub-Saharan savanna and the Afromontane forest; the MBR is exceptionally diverse in fauna, flora and animal species.

The Magaliesberg Biosphere is owned and managed by the people who live within it, and by their elected representatives.

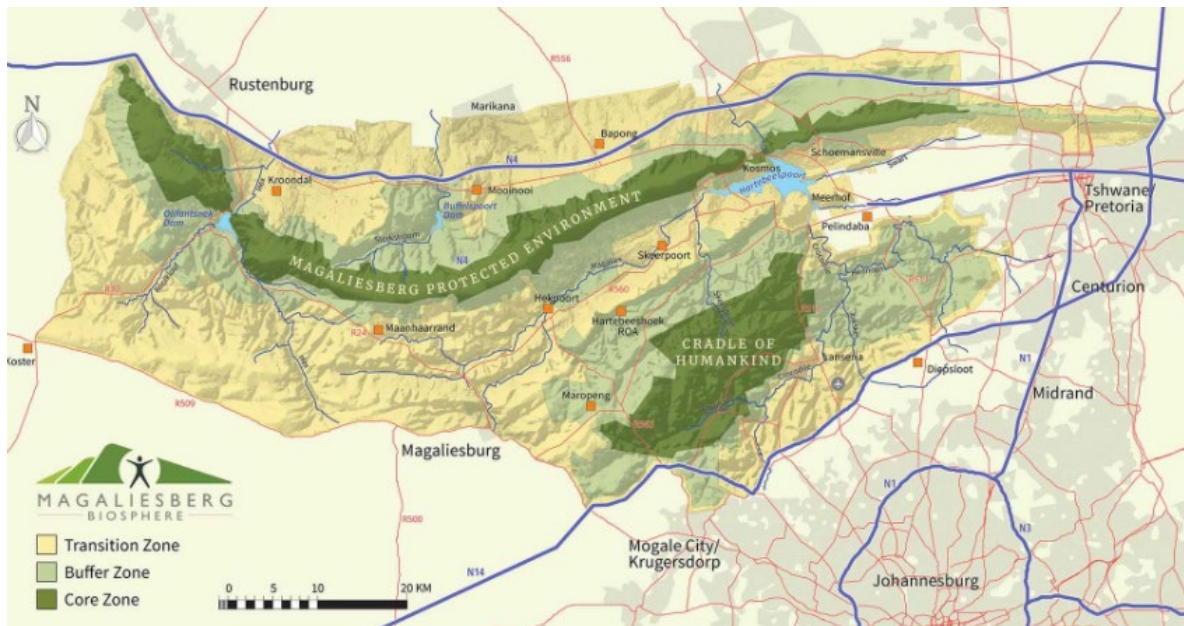


Figure 9: Magaliesberg Biosphere

3.2.4 GAUTENG RIDGES POLICY

The ridges of Gauteng are one of the most important natural assets in the northern provinces of South Africa. This is because these ridges, and the area immediately surrounding the ridges, provide habitat for a wide variety of fauna and flora, some of which are Red List, rare or endemic species. The purpose of the Gauteng Ridges policy is to guide development with a view of ensuring that ridges are conserved and used in a sustainable manner.

In order to give practical effect to this policy the Department has classified all ridges in Gauteng into one of four classes based on the existing extent and percentage of area converted to urban development or other human activities. These classes are as follows:

- Class 1 includes ridges of which 5% or less of their surface area has been converted to urban development.
- **Class 2 includes ridges of which more than 5% but less and 35% of their surface area has been converted to urban development.**
- Class 3 includes ridges of which more than 35% but less than 65% of their surface area has been converted to urban development.
- Class 4 includes ridges of which 65% or more of their surface area has been converted to urban development.

The guidelines applicable to Class 2 Ridges are as follows:

- The consolidation of properties on Class 2 ridges is supported.
- The subdivision of property on Class 2 ridges will not be permitted.
- Development activities and uses that have a high environmental impact on a Class 2 ridge will not be permitted.
- Low impact development activities, such as tourism facilities, which comprise of an ecological footprint of 5% or less of the property may be permitted. (The ecological footprint includes all areas directly impacted on by a development activity, including all paved surfaces, landscaping, property access and service provision).
- Low impact development activities on a ridge will not be supported where it is feasible to undertake the development on a portion of the property abutting the ridge.

The Proposed Activity is a tourism facility and the property size is approximately 163.3 ha in extent and will not be subdivided. The proposed development will have a maximum footprint of approximately 8.16 ha (therefore below 5% of the total property size) The Proposed Activity is therefore in line with the Gauteng Ridges Policy.

3.2.5 THE MOGALE CITY LOCAL MUNICIPALITY INTEGRATED DEVELOPMENT PLAN (IDP) 2016-2021 (2017/18)

According to the above mentioned IDP, there are no developments earmarked for the site of application. The IDP does, however make mention of the socio-economic trends within the Municipality's jurisdiction. The unemployment rate is reported to be significantly high and employment is continuing to decrease. With the proposed Project 58 development, more opportunities for employment will be created which is not only a benefit for the municipality but for the Mogale City community as a whole as it contributes positively to the local economy.

In terms of the existing infrastructure, but with specific reference to electricity supply, the Municipality is struggling with its capacity and it will require a new substation to be built in order to accommodate the demand. In the meantime the existing substations are being upgraded. Considering the size of the proposed development and its dedication to being an environmentally sustainable development, it does not pose a threat to the municipality's power supply. Further confirmation of this shall be provided once the Outline Scheme Reports have been concluded and exact amount of bulk services required for this development have been determined.

In addition to the above, Mogale City has identified a number of key Strategic priorities for the upcoming five (5) years and these include, improving the financial health of the municipality; upgrade and expand infrastructure to provide for changing development needs; build viable and sustainable communities; maximise economic potential for Mogale City; and promote and support job creation especially for the youth. The proposed development is in line with the strategic priorities listed in the IDP.

3.2.6 MOGALE CITY LOCAL MUNICIPALITY (MCLM) SPATIAL DEVELOPMENT FRAMEWORK (SDP) -2019/2024

The MCLM SDP outlines the spatial objectives and strategies for MCLM for the next five years. Those which support developments like that of Project 58 are listed below:

- Environmental Protection & Resource Management
 - Protection of the natural open system
 - Balancing environmental protection with sustainable development
- Economic Opportunity & Proximity
 - Rural economy
 - Strengthen the agriculture sector and agrarian transformation
 - Nurture & protect the rural environment in general & nature reserves in particular
 - Encourage the establishment of game farms & resorts
 - Encourage & facilitate rural tourism
 - Encourage & facilitate the green & blue industries
 - Tourism & Hospitality Industry
 - Township Economy
- Liveability & Sense of Place
 - Implement the township regeneration approach
 - Facilitate the development of sustainable rural residential developments

Providing bulk infrastructure in the sparsely settled areas of MCLM is recognised in the SDF as “prohibitively expensive”. The priority Water & Sanitation projects are focused on upgrading informal settlement and providing supporting infrastructure to the Lanseria and Cosmo City developments in the City of Johannesburg. This limits the amount of infrastructure that can be provided for developments such as Project 58 and requires them to be as self-sufficient as possible.

4. NEED AND DESIRABILITY

As stated in the DEA Need and Desirability guideline (GNR 891 of 2014), it is essential that growth in the economy addresses national policies and strategies. The implementation of these policies (social and economic) needs to take into consideration concerns such as climate change, food security and the status of ecosystem services. To achieve a better quality of life for all, society needs to improve the efficiency and responsibility with which resources are used. The proposed activity was considered under the following two strategic goals:

4.1 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

Tourism is a major contributor to the South African economy, with tourism injecting R116,9billion into the South African economy in 2018/19 through the direct spend of both international and domestic tourists. International tourists indicated a 12.7% increase and domestic tourism grew by a healthy 35.7%. This serves as testimony that South Africa is globally and locally a place to visit. In terms of the estimated tourism contribution to the South African economy, tourism provides approximately 1.5million jobs–9.2% of the total employment. For this reason, government has set itself the ambitious target of attracting 21 million international tourists by 2030 as announced by President Cyril Ramaphosa. To do so it will require the co-operation and collaboration of different stakeholders throughout the value chain. The rising global consciousness of sustainable environmental practices has impacted travel and tourism as tourists are adapting their travel behaviours in favour of responsible tourism products and destinations. Additionally, different types of tourism have over the years begin to define themselves i.e. adventure tourism, medical tourism, ecotourism, nature tourism, ethical tourism, wildlife tourism, holistic or wellness tourism etc. Of these variations of tourism, Project 58 speaks to holistic/wellness tourism. This is explained as a new and alternative form of tourism and an important trend among tourists who seek programs and experiences that would allow them to achieve balance between mind, body and soul. This type of tourism focusses on enhancing wellbeing through self-transformation and on people attempting to understand more of themselves.

4.2 SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

This goal aims to improve the efficiency and responsibility with which resources are used. Thus, while there is a need for economic and social development, all of the impacts have to be taken into consideration in order to ensure long-term sustainable development.

The proposed project is located in the Magaliesberg Biosphere Reserve – the meeting point of three different kinds of biomes which makes it exceptionally diverse in fauna, flora and animal species. It's also home to the Cradle of Humankind, a UNESCO World Heritage Site 50 km northwest of Johannesburg, South Africa. This area hosts the archaeological finds of the earliest hominid specie and is a popular local and international tourist attraction.

The proposed project aims to develop a world class authentic retreat in the Cradle of Humankind that provides a platform for people to connect to themselves and their environment, to live a happier and more conscious existence. The project enables a more conscious existence by recognising what makes us human and re-aligning ourselves with nature. By creating ecologically restorative places and integrated programs, the project seeks to nudge society from a culture of exploitation to one of contribution and regeneration.

The proposed activity will therefore be constructed on sustainable principles and also promote sustainability. A number of mitigation measures will be implemented during the construction as well as the operational phases to ensure that the impact on the environment is as low as possible.

5. PROJECT ALTERNATIVES

One of the objectives of an EIA is to investigate alternatives to the proposed project. The EIA Regulations 2014 define alternatives as:

“different means of meeting the general purpose and requirements of the activity, which may include alternatives to; -

- a) the property on which or location where it is proposed to undertake the activity;*
- b) the type of activity to be undertaken;*
- c) the design or layout of the activity;*
- d) technology to be used in the activity; or*
- e) operational aspects of the activity”*

All proposed alternatives must be both reasonable and feasible.

5.1 SITE ALTERNATIVES

Due to the lack of any other suitable land in the area, owned by the Applicant or available to the Applicant, no other site alternatives could be identified for the proposed development.

5.2 LAND USE ALTERNATIVES

In accordance with the GPEMF **desirable development activities** for the Primary Zone of the CHKWHS Special Control Zone includes boutique hotels and lodges as well as tourism incentive accommodation. As the Proposed Activity falls within this category and no other feasible Land Use Alternatives, that are similarly in line with the GPEMF could be identified, the Proposed Activity was assessed in conjunction with two technology alternatives.

5.3 LAYOUT AND OPERATIONAL ALTERNATIVES

The Proposed Activity Layout (**Figure 3**) and the associated operational offerings and activities went through an organic process of collaboration of artists, architects, permaculturalists, spiritualists, investors, business operators, yogis, doctors, psychologists and community members. Although various other concept layouts were explored throughout the non-linear design process they were scoped out and the Applicant believes that he proposed Layout (**Figure 3**) offers the most holistic understanding of the site with the lowest environmental impact.

5.4 TECHNOLOGY ALTERNATIVES

Two technology alternatives have been identified for the proposed off-grid electricity supply i.e. Polycrystalline vs Concentrating Solar Power technology. The following two identified technology alternatives have been assessed in this Draft BAR.

5.5 ALTERNATIVES ASSESSED

5.5.1 ALTERNATIVE 1 – PROPOSED ACTIVITY

Alternative 1 includes the development of a tourism facility on Portion 58 of the Farm Kromdraai 520 JQ in the Cradle of Humankind, Mogale City Local Municipality, Gauteng. The property size is approximately 163.3 hectares (ha) in extent and the proposed development will have a maximum footprint of approximately 8.16 ha (therefore below 5% of the total property size). Alternative 1 includes the following proposed off-grid electricity supply technology:

Micromorph thin – film photovoltaic module” technology for the solar panels

The preferred technology alternative to generate electricity is by utilising “Micromorph thin – film photovoltaic module” (TF PV) technology. The proposed system creates approximately 1 MW of electricity for every 3 hectares (in optimal conditions) of solar panels. The solar panels are light and thin and can be will placed on building north facing roofs at an optimum angle for optimal solar radiation absorption.

Electricity generated by TF PV modules is being transmitted into a local grid through an inverter – a device that converts direct current (DC) to alternating current (AC). Refer to **Figure 10**.

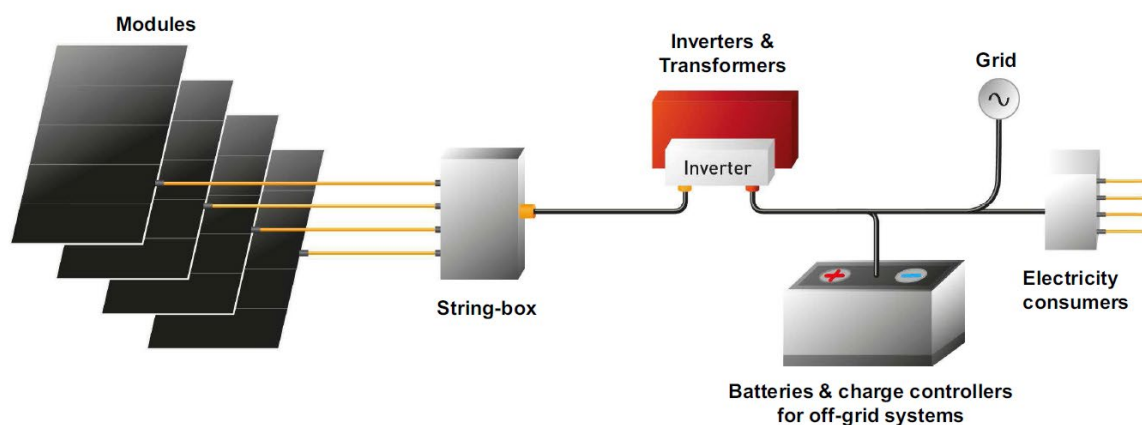


Figure 10: Micromorph thin – film photovoltaic module” technology

5.5.2 ALTERNATIVE 2 – TECHNOLOGY ALTERNATIVE

Alternative 2 includes the development of a tourism facility on Portion 58 of the Farm Kromdraai 520 JQ in the Cradle of Humankind, Mogale City Local Municipality, Gauteng. The property size is approximately 163.3 hectares (ha) in extent and the proposed development will have a maximum footprint of approximately 8.16 ha (therefore below 5% of the total property size). Alternative 2 includes the following proposed off-grid electricity supply technology:

CSP dish technology

CSP Dish technology utilises focused sunlight to create electricity. CSP plants generate electric power by using mirrors to concentrate the sun's energy and convert it into high-temperature heat. The heat is then channelled through a conventional generator, which produces the electricity. The plants consist of two parts: one component that collects solar energy and converts it to heat and another that converts the heat energy to electricity.

As concentrated sunlight falls on the receiver it heats the gas in the tubes to very high temperatures which causes hot gas to expand inside the cylinders. The expanding gas drives the pistons and turn a crankshaft which drives an electric generator. The receiver, engine and generator comprise of a single, integrated assembly mounted at the focus of the mirror dish. Refer to **Figure 11**.

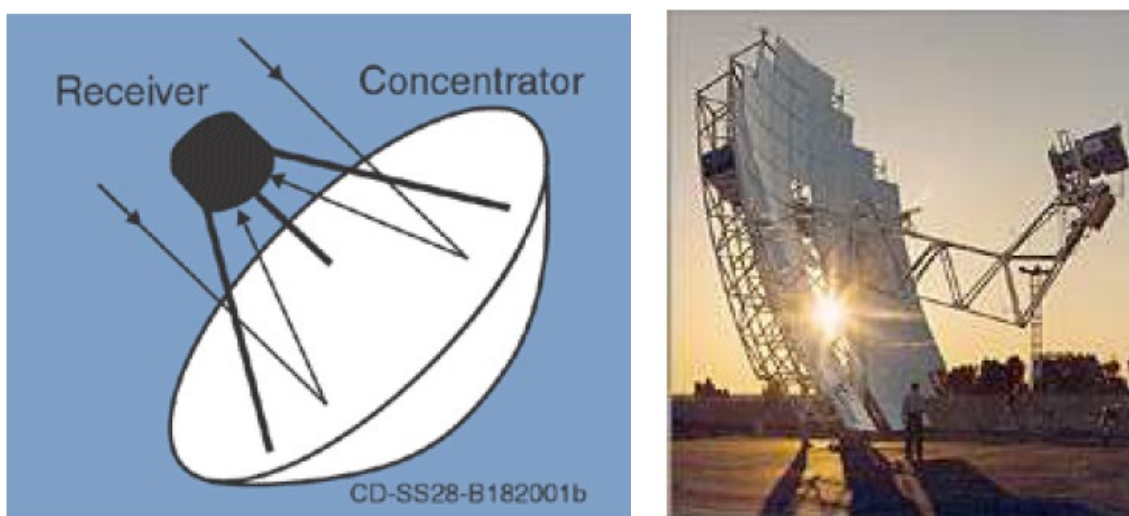


Figure 11: CSP dish technology

5.5.3 NO-GO ALTERNATIVE

The No-Go Alternative relates to the status quo (i.e. what is likely to happen if the project is not authorised or does not proceed). The No-Go alternative provides the assessment with a baseline against which predicted impacts resulting from the proposed development may be compared.

If the project does not proceed, the impact will be negative on tourism, local economic development and job creation. Possible jobs that could have been created during the construction phase include: construction, transport of materials and security. Possible jobs that could have been created during the operational phase include: permanent staff.

The Socio-Economic Impact Assessment (SIA) (see **Annexure F**) is in favour of the proposed development as a result of the identified Socio-Economic benefits and therefore don't support the No-Go Alternative.

6. PUBLIC PARTICIPATION

Public consultation is a legal requirement throughout the BAR process. All documents must be made available for public review and comment by the proponent, these include Notification documents the Draft BAR, the Final BAR and the decision of the Competent Authority.

A Public Participation Plan in line with the Directions Regarding Measures to Address, Prevent and Combat the Spread of Covid-19 Relating to the National Environmental Management Permits and Licences (GN No 970 of 9 September 2020), was submitted to DEFF and approved – refer to **Annexure E.8** of the Draft BAR for the Approved Public Participation Plan.

The method of public consultation to be used depends largely on the location of the development and the preferred language and level of literacy of those being impacted on by the project. Required means of public consultation include:

- Site notice(s);
- Newspaper advertisements;
- Letters of notification and information to affected landowner(s), stakeholders and registered I&APs;

- Stakeholder meetings; and
- Authority and Stakeholder engagement

Refer to **Annexure E** for proof of the public participation process to date.

6.1 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

The proposed activity was advertised in the Citizen Newspaper on Thursday, 27 August 2020. The advertisement provided an overview of the details of the proposed development and provided I&APs with the information on how and where to register their interest or provide comment.

A background information document (in the form of a Scoping Report) was made available to I&AP's for a 30-day period (**Thursday, 27 August 2020 to Monday 28 September 2020**). All comments received during the notification period have been recorded and addressed and is included in **Annexure E.6** of the Draft BAR.

6.2 DRAFT BASIC ASSESSMENT PHASE

Notification of the relevant Basic Assessment Reporting process and availability of the Draft BAR was advertised on Monday, 12 April 2021 in accordance with the 2014 NEMA EIA Regulations, as amended (Chapter 6 of GNR 326 of April 2017).

The Draft BAR was made available to I&AP's for a 30-day period (**Monday, 12 April 2021 to Friday, 14 May 2021**). Proof of notification of the Draft BAR will be included in the Final BAR.

All comments received on the Draft BAR will be recorded and addressed and included in **Annexure E.6** of the Final BAR for submission to DEFF.

6.3 STAKEHOLDER MEETINGS

A stakeholder meeting will be held with registered Stakeholders and I&AP's based on demand and will be in the form of a Virtual Meeting – in line with the Covid-19 Regulations (GN No 970 of 9 September 2020).

7. DESCRIPTION OF THE ENVIRONMENT

7.1 BIOPHYSICAL ENVIRONMENT

7.1.1 CURRENT LAND USE

The main land use types/units present on the study site are undulating grassy plains, rocky ridges, non-perennial streams, with well-developed riparian vegetation components, in certain areas along the streams. The study site is relatively undisturbed with the major anthropogenic disturbances being a few buildings, old agricultural fields in an advanced stage of succession and man-made soil dams.

7.1.2 CLIMATE

The site lies between 1419 and 1600 meters above sea level. The climate is warm and temperate. In winter, there is much less rainfall than in summer. Total annual precipitation is approximately 759 mm. The average annual temperature is 15.6 °C. January is the warmest month of the year with temperature averages of 20.1 °C. In June is the coldest month of the year and the average temperature is 9.1 °C.

7.1.3 GEOLOGY

According to the Geotechnical Investigation of the site (WSP, 2020) (**Annexure D**) the proposed site is situated on the south-eastern contact between the Chunniespoort Dolomite and the older, underlying Ventersdorp Supergroup lithologies.

The 1:50 000 geological map (2527DD Broederstroom) indicates that the site is underlain by at least three different formations. The northern most tips of the north-western site extensions are mapped as being underlain by dolomite of the Malmani Subgroup. As the Oaktree Formation is the basal formation of the Malmani Subgroup, the dolomite on site is likely to belong to that formation. The vast majority of the site is mapped as the Kameelsdoorns Formation of the Ventersdorp Supergroup. Here the formation is mapped as either sandy shale (Vs) or conglomerate, grit and quartzite (Vr) (refer to **Figure 12**). Between the main lithologies lies the Black Reef Quartzite Formation. This forms the base of the Pretoria Group and consists of quartzite, conglomerate and shale.

Following the mapping of the site it was confirmed that the geological map was relatively accurate and that dolomitic land was therefore present. The dolomite stability investigation was therefore initiated on the areas of dolomite land that were to be developed under the proposed development plan available at the time. The dolomite stability investigation was undertaken in-line with the requirements of SANS 1936, which based on the on the results of the gravity survey and the proposed development layout, included drilling of strategically positioned boreholes.

The results from the drilling together with that from gravity survey and drillers logs were thereafter interpreted to conceptualise the dolomite stability assessment of the footprint area. The development density on the dolomite land is very low and only low-level structures are planned.

The general conclusion is that the site is considered suitable for the proposed development with only minimal geotechnical considerations.

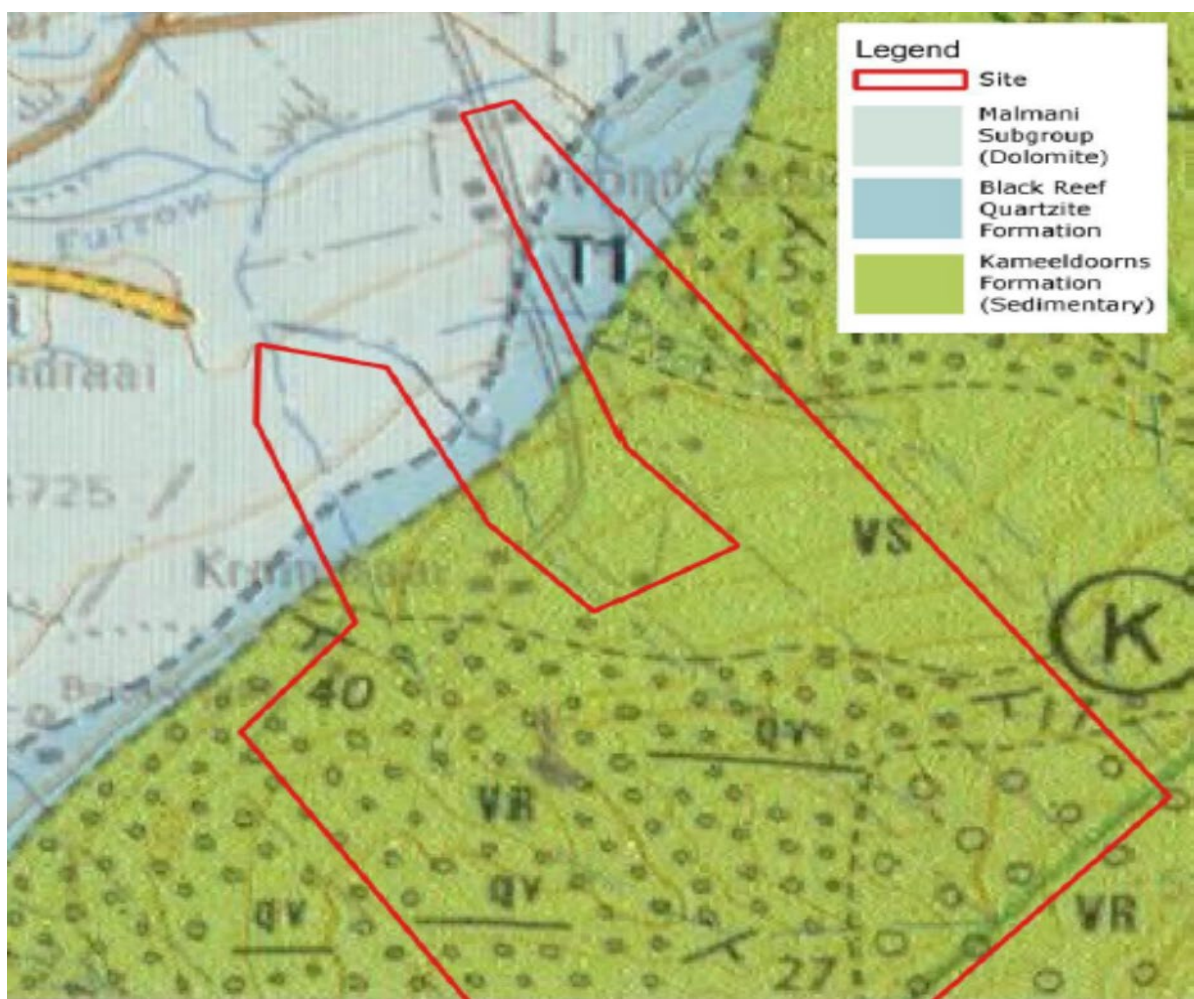


Figure 12: Geological Map

7.1.4 HYDROLOGY

According to the Roads and Stormwater Report (WSP 2020) [Annexure D] the proposed site has three natural drainage paths, all of which run from South to North towards the Bloubankspruit River. **Figure 13** shows the drainage paths within the site boundary.

The floodline analysis shows that the development in the western arm of the property will be affected by a 1:50 and the 1:100 year flood. This primarily because the central drainage path does not have a clearly defined channel at the section outlined in red in **Figure 13**, which means that water spills out of the drainage path and floods the development.

It is suggested that a channel be recreated in this section with the required capacity to direct the floodwater to the Bloubankspruit.

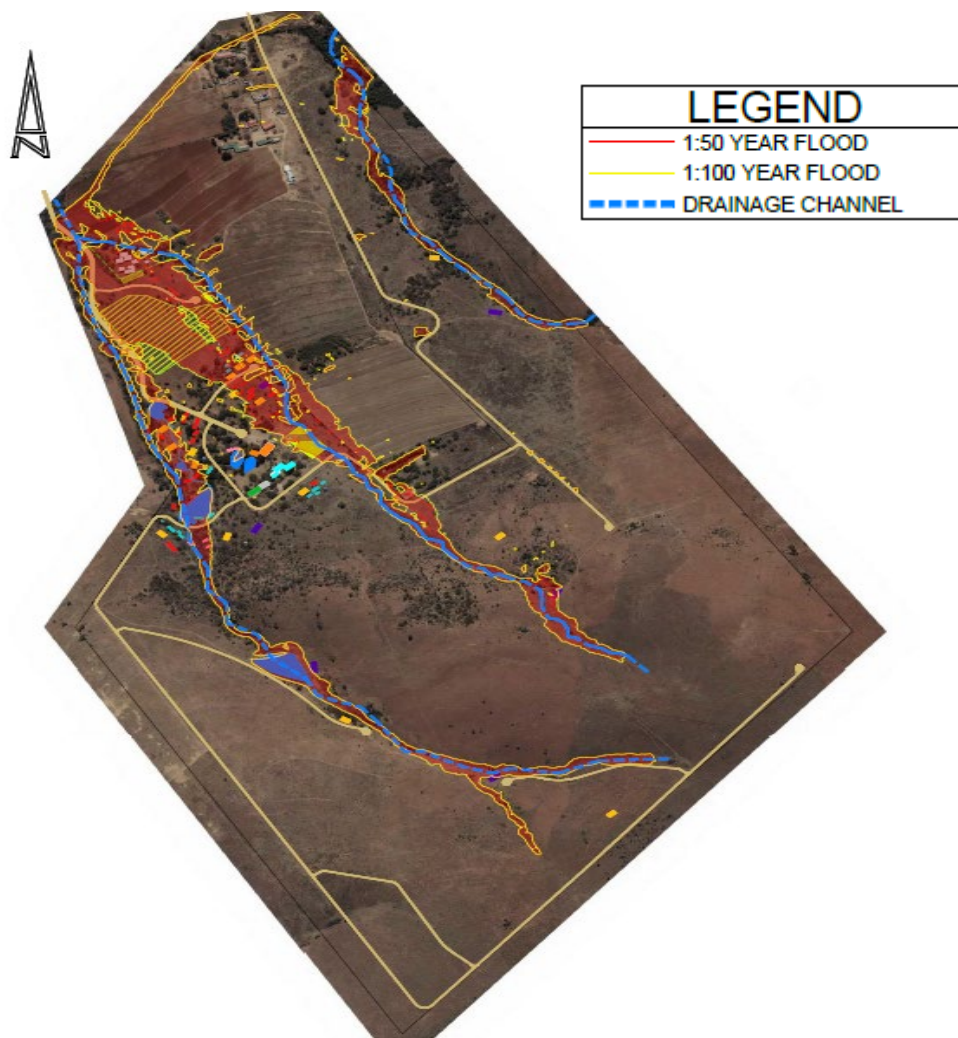


Figure 13: Floodline Layout Plan

A wetland assessment showed that riparian areas associated with the non-perennial streams on site are in very good ecological condition with no serious erosion features to be seen. These habitats support various Fauna and Flora and provides ecosystem goods and services on the site but also off site.

A Present Ecological Status score of “B” was awarded indicating that the system is largely natural with only a few modifications. The Ecological Importance and Sensitivity score was 3,73 which indicates that riparian areas on the site has a very high Ecological Importance and Sensitivity.

The wetland specialist recommended that the non-perennial streams on the study site should be avoided as far as possible and that a 30m buffer be implemented around these aquatic habitats with no development to take place within the 30m buffer zone.

7.1.5 GEOHYDROLOGY

The site is located in the Zwartkrans Groundwater Management Zone, within the A21D-04 Groundwater Management Unit. In this Unit, according to the West Rand Dolomite Compartment Map (Department of Water Affairs, 2009) the groundwater elevation is 1396-1473 mamsl, a variance of 77m. Refer to **Figure 14**.

Groundwater elevation data was obtained from the Department of Water Affairs' National Groundwater Archive (NGA) in June 2020. The elevation of the water in the boreholes within 1.5km of the site edge, vary significantly but show consistent trends. Along the Bloubanksruit valley, close to the river, the levels are lower and as one would expect, the water elevation rises as you move up the slopes away from the river. Based on this data the water level, at the site's distance from the river, is expected to be approximately 1420 mamsl.

The site owner supplied the location of five boreholes currently used for water abstraction on the site. The water level at time of establishing these wells were also provided. During the site visits the location of the wells were confirmed but the water levels in each could not be confirmed as they were all equipped with water extraction equipment. The boreholes are located on the Black Reef Formation and on the Ventersdorp Supergroup. Those located on the Black Reef Formation are however 37-87m deep and therefore likely intersect the dolomitic formations under the Black Reef. Most of the levels indicate that the water is located >24m

below surface and the level appears to increase as one moves north from the contact. One borehole was however reported to have a water level of only 3m below surface. This borehole was located downstream to a small farm dam, and therefore may have been located in a subsurface preferential flow path, where seepage from the dam results in constant high water levels in that borehole.

Based on this site borehole data provided the groundwater is expected to be located at least 24m below surface and at an elevation of 1418-1432 mamsl. These levels are therefore similar to that indicated by the NGA data.

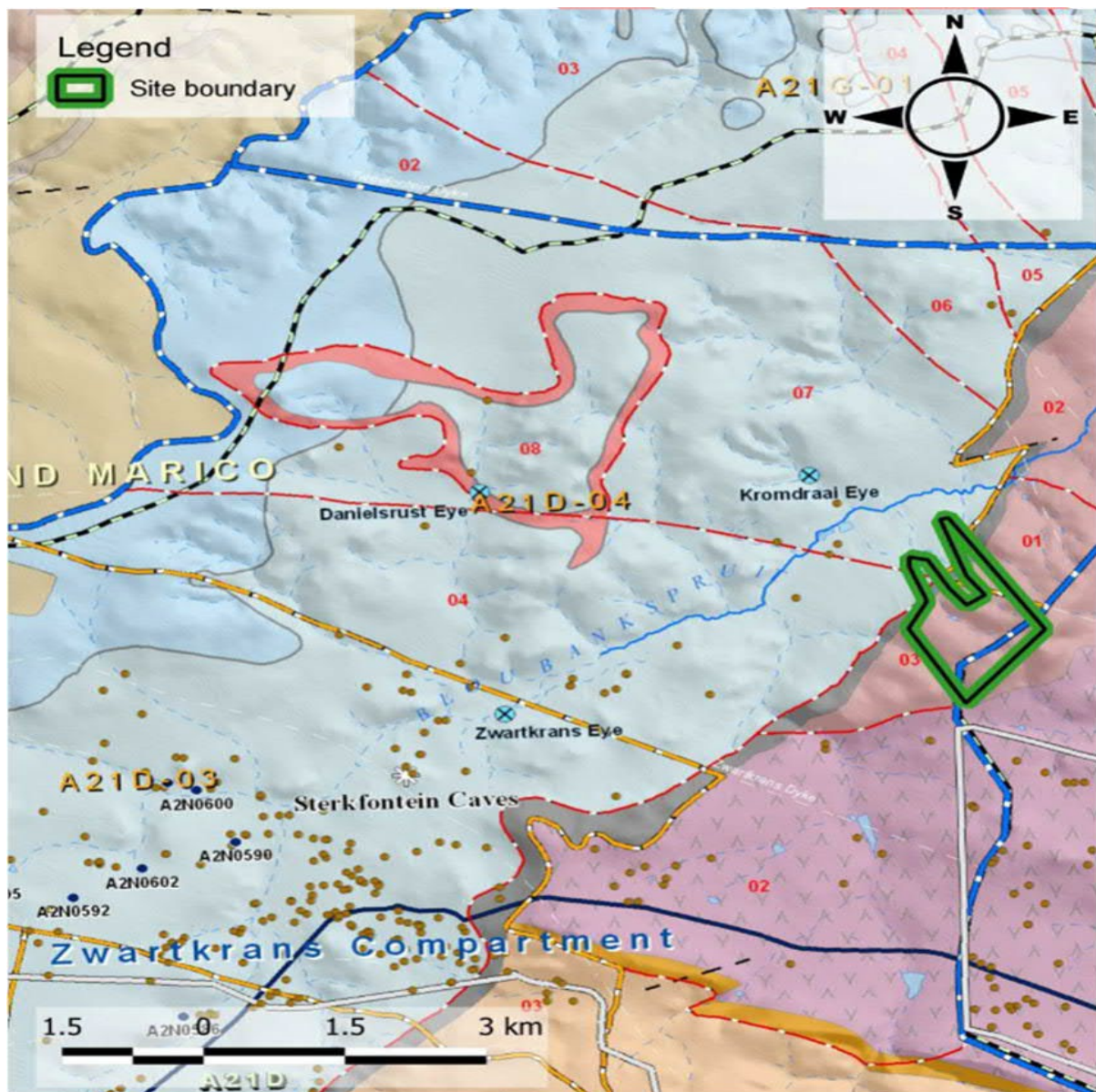


Figure 14: Groundwater compartment map with site location on edge of dolomitic land

7.1.6 ECOLOGY

An Ecological Assessment was conducted by ECI in April 2019. Refer to **Annexure F** for the Ecological Assessment Report. A summary of the report follows:

The desktop study that was undertaken, made use of The Vegetation of South Africa, Lesotho and Swaziland by Mucina & Rutherford as well as the Vegmap of the South African National Biodiversity Institute's (SANBI) Biodiversity Geographic Information System (BGIS). According to these sources the following vegetation information is relevant to all nine of the ecological areas:

- **Biome** – Savannah & Grassland
- **Bioregion** – Central Bushveld Bioregion & Mesic Highveld Grassland
- **Vegetation type** – Andesite Mountain Bushveld & Egoli Granite Grassland

9.1.3.1 Andesite Mountain Bushveld

The conservation status of this vegetation type is classified as **Least threatened**. 7% is statutorily conserved in the Suikerbosrand Nature Reserve and the Magaliesberg nature area. More than 15% of this vegetation type has already been transformed from its natural state by various anthropogenic activities such as expansion of human settlements, urban areas and cultivation.

9.1.3.2 Egoli Granite Grassland

The conservation status of this vegetation type is classified as **Endangered**. More than two thirds of this vegetation type have already undergone transformation mostly due to expanding urbanisation, construction of roads and cultivation. The current transformation rate threatens the areas which doesn't fall under conservation areas. Only 3% is statutorily conserved in nature reserves. More than 15% of this vegetation type has already been transformed from its natural state by various anthropogenic activities such as expansion of human settlements, urban areas and cultivation.

9.1.3.3 Gauteng Conservation Plan

The Gauteng Conservation Plan (C-Plan) places different habitats in different categories. These categories need to be taken into account during the environmental assessment process. The categories are the following: Critical Biodiversity Areas (CBA's) and Ecological

Support Areas (ESA's). The CBA's is in turn further divided into CBA Irreplaceable Areas and CBA Important Areas. According to the Gauteng C-plan a large section of the study site is classified as an Important Area whereas the remaining section (towards the north) is classified as Ecological Support Area. Refer to **Figure 15**.

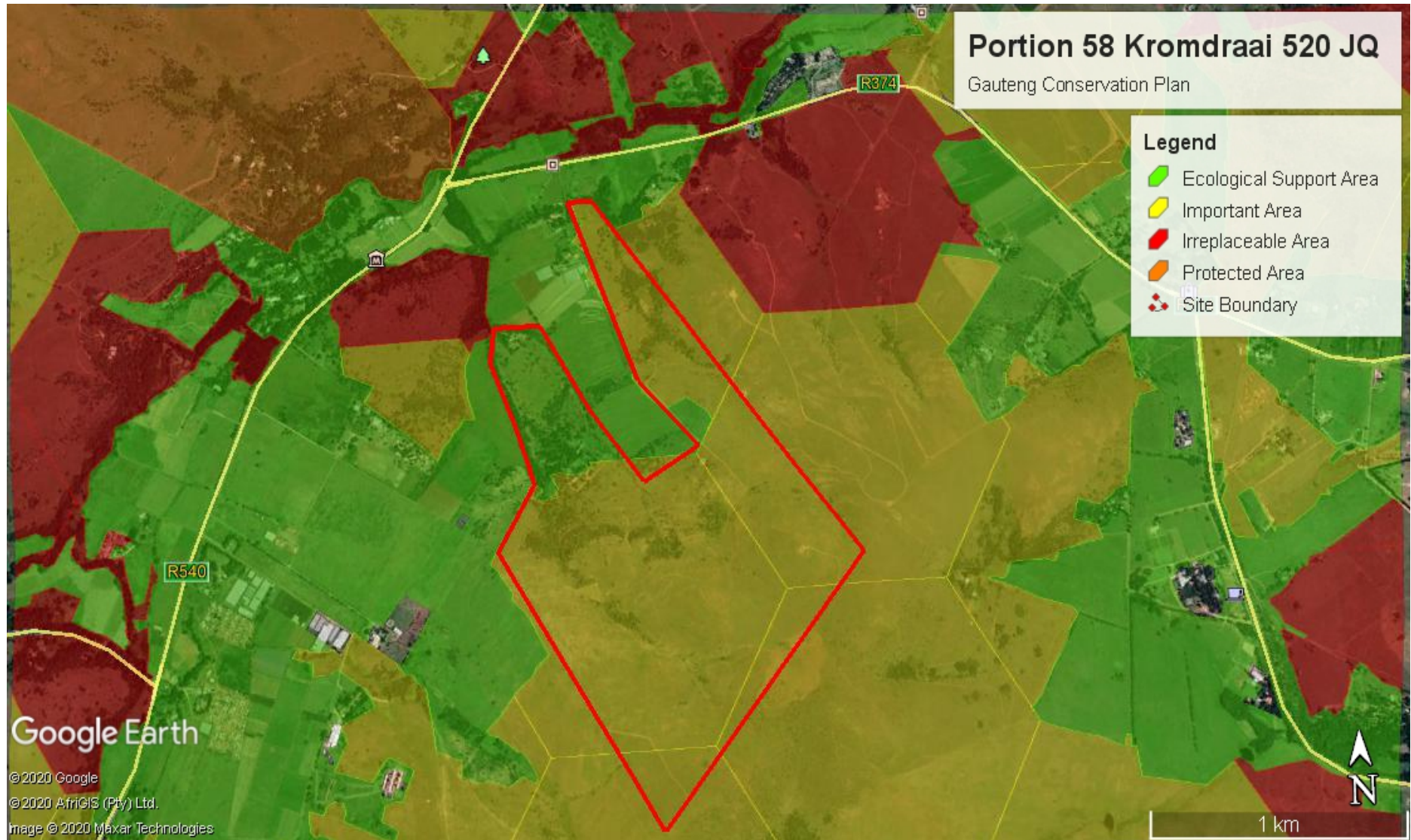


Figure 15: Gauteng Conservation Plan

9.1.3.4 Gauteng Ridges Policy

According to the Gauteng Ridges Policy the majority of the study site falls under a Class 2 ridge classification (Refer to **Figure 16**). This Policy state the following:

“The quartzite ridges of Gauteng are one of the most important natural assets in the northern provinces of South Africa. This is because these ridges, and the area immediately surrounding the ridges, provide habitat for a wide variety of fauna and flora, some of which are Red List, rare or endemic species or, in the case of certain of the plant species, are found nowhere else in South Africa or the world. The ridges also fulfil functions that are necessary for the sustainability of ecosystems such as the recharging of groundwater, wetlands and rivers, wildlife dispersal and providing essential habitat for pollinators. Ridges also have a socio-cultural role in that they provide aesthetically pleasing environments that are valued by residents, tourists and recreational users. Human activities such as urbanization, mining and the planting of alien vegetation may undermine the contribution that ridges make to the environment”.

This emphasizes the importance of these landscape types within the Gauteng Province. The following guidelines are applicable to the use and development of Class 2 ridges:

- The consolidation of properties on Class 2 ridges is supported.
- The subdivision of property on Class 2 ridges will not be permitted.
- Development activities and uses that have a high environmental impact on a Class 2 ridge will not be permitted.
- Low impact development activities, such as tourism facilities, which comprise of an ecological footprint of 5% or less of the property may be permitted. (The ecological footprint includes all areas directly impacted on by a development activity, including all paved surfaces, landscaping, property access and service provision).
- Low impact development activities on a ridge will not be supported where it is feasible to undertake the development on a portion of the property abutting the ridge.

The Proposed Activity is a tourism facility and the property size is approximately 163.3 ha in extent and will not be subdivided. The proposed development will have a maximum footprint of approximately 8.16 ha (therefore below 5% of the total property size) The Proposed Activity is therefore in line with the Gauteng Ridges Policy.

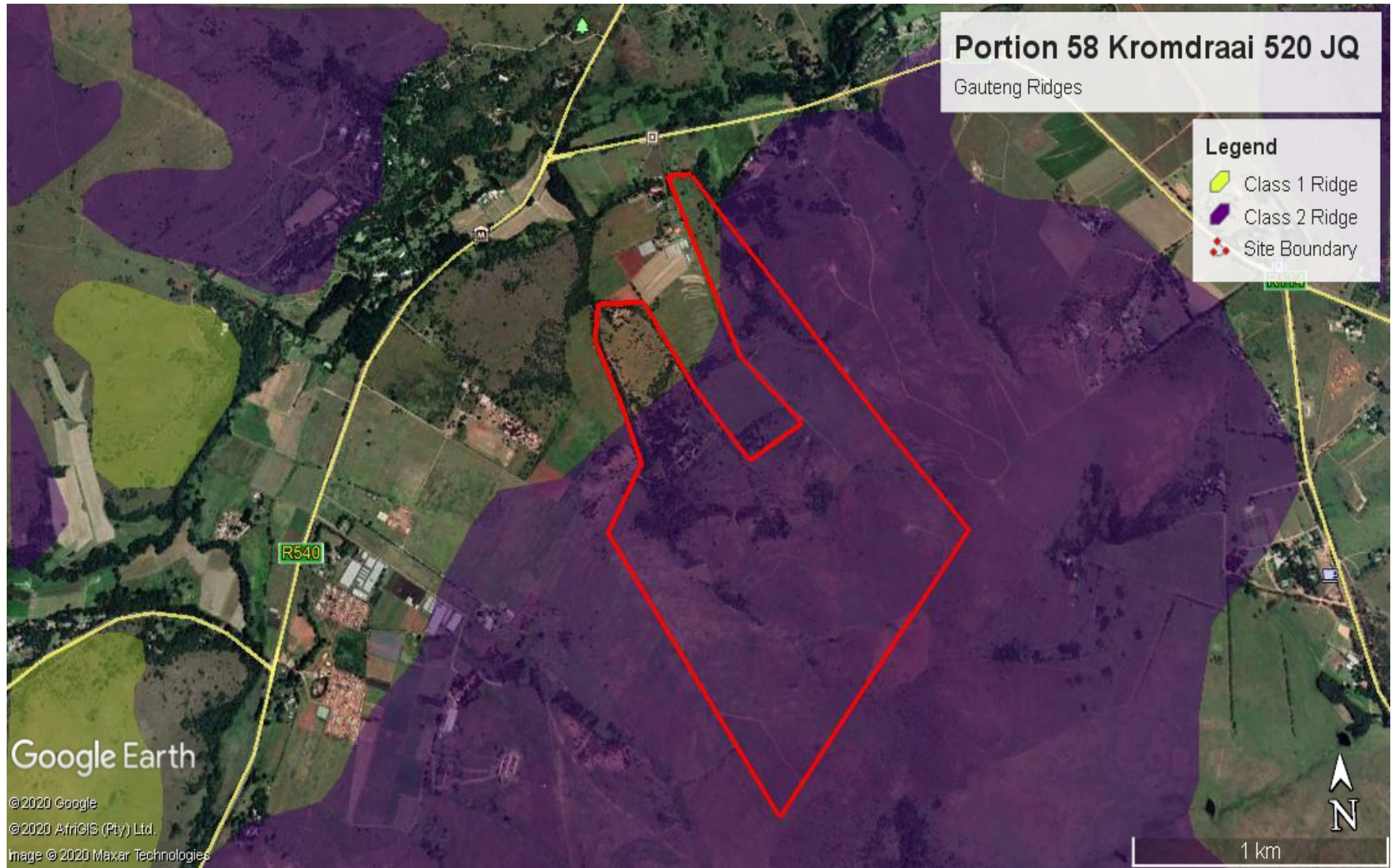


Figure 16: Gauteng Ridges

9.1.3.4 Field survey results

The results from the site survey which was undertaken on the **23 April 2019** are recorded in this section. **Table 4** below lists all the indigenous vegetation species recorded on the study site as well as the non-indigenous species. Refer to **Figure 17** for the Ecological Sensitivity Map.

Table 4: Species list of vegetation recorded during the field survey

Indigenous species		Exotic/Non-indigenous species	
Scientific name	Common name	Scientific name	Common name
<i>Themeda triandra</i>	Red grass	<i>Lantana camara</i>	Lantana
<i>Erythrina lysistemon</i>	Common coral tree	<i>Tagetes minuta</i>	Khaki weed
<i>Vachellia sieberiana</i>	Paperbark thorn	<i>Bidens Pilosa</i>	Blackjack weed
<i>Cymbopogon caesius</i>	Common turpentine grass	<i>Acacia mearnsii</i>	Black wattle
<i>Celtis Africana</i>	White stinkwood	<i>Solanum mauritianum</i>	Bug weed
<i>Gymnosporia buxifolia</i>	Common spikethorn	<i>Verbena bonariensis</i>	Tall verbena
<i>Searsia lancea</i>	Karee	<i>Acacia dealbata</i>	Silver wattle
<i>Hyparrhenia hirta</i>	Common Thatching Grass	<i>Campuloclinium macrocephalum</i>	Pom-Pom weed
<i>Dichrostachys cinerea</i>	Sickle bush	<i>Melia azedarach</i>	Syringa
<i>Searsia pyroides</i>	Common wild currant	<i>Jacaranda mimosifolia</i>	Jacaranda
<i>Ziziphus mucronata</i>	Buffalo thorn	<i>Datura stramonium</i>	Common thorn apple
<i>Melinis repens</i>	Natal red top		
<i>Morus alba</i>	Common mulberry		
<i>Leonotis leonurus</i>	Wild dagga		
<i>Olea europaea subsp. africana</i>	Wild olive		
<i>Vachellia karroo</i>	Sweet thorn		
<i>Combretum erythrophyllum</i>	River bushwillow		
<i>Celtis africana</i>	White stinkwood		
<i>Diospyros lycioides</i>	Blue bush		
<i>Ehretia rigida</i>	Puzzle bush		
<i>Asparagus laricinus</i>	Bushveld Asparagus		
<i>Opuntia ficus-indica</i>	Prickly pear		
<i>Typha capensis</i>	Bulrush		
<i>Buddleja salviifolia</i>	Sagewood		

Indigenous species		Exotic/Non-indigenous species	
<i>Zantedeschia aethiopica</i>	Common Arum lily		
<i>Kiggelaria africana</i>	Wild peach		
<i>Brachylaena rotundata</i>	Mountain silver oak		
<i>Vachellia robusta</i>	Broadpod robust thorn		
<i>Seriphium plumosum</i>	Bankrupt bush		
<i>Gomphocarpus fruticosus</i>	Milkweed		
<i>Canthium gilfillanii</i>	Velvet Rock Alder		
<i>Euclea crispa</i>	Blue guarri		
<i>Lopholaena coriifolia</i>	Small leaved fluff bush		
<i>Ancylobotrys capensis</i>	Rock milk apricot/Wild apricot		
<i>Pellaea calomelanos</i>	Hard fern		
<i>Combretum molle</i>	Velvet bush willow		
<i>Dombeya rotundifolia</i>	Wild pear		
<i>Vangueria infausta</i>	Wild medlar		
<i>Tarchonanthus camphoratus</i>	Camphor bush		
<i>Xerophyta retinervis</i>	Black stick lily		
<i>Englerophytum magalismontanum</i>	Transvaal milkplum		
<i>Searsia magalismontana subsp. magalismontana</i>	Bergtaaibos		
<i>Senegalia caffra</i>	Common hook-thorn		
<i>Aloe greatheadii</i>	Spotted aloe		
<i>Phragmites australis</i>	Common reed		
<i>Searsia leptodictya</i>	Mountain karee		
<i>Imperata cylindrica</i>	Cotton-wool grass		
<i>Boophone disticha</i>	Poison bulb		
<i>Protea caffra</i>	Sugar bush		
<i>Grewia flava</i>	Raisin bush		
<i>Hypoxis rigidula</i>	Silver-leaved star flower		
<i>Zanthoxylum capense</i>	Small knobwood		
<i>Rothmannia capensis</i>	Wild gardenia		
<i>Heteromorpha arborescens</i>	Parsley tree		
<i>Ozoroa paniculosa</i>	Common resin tree		
<i>Pappea capensis</i>	Jacket plum		

Indigenous species		Exotic/Non-indigenous species	
<i>Strychnos pungens</i>	Spine-leaved monkey-orange		
<i>Pogonarthria squarrosa</i>	Herringbone grass		
<i>Elephantorrhiza burkei</i>	Elephant-root		
<i>Ledebouria zebrina</i>	Giant false scilla		
<i>Aloe marlothii</i>	Mountain aloe		
<i>Ficus ingens</i>	Red-leaved rock fig		
<i>Pittosporum viridiflorum</i>	Cheesewood		
<i>Rhamnus prinoides</i>	African Dogwood		
<i>Prunus africana</i>	African Almond		
<i>Setaria megaphylla</i>	Broad-leaved bristle grass		

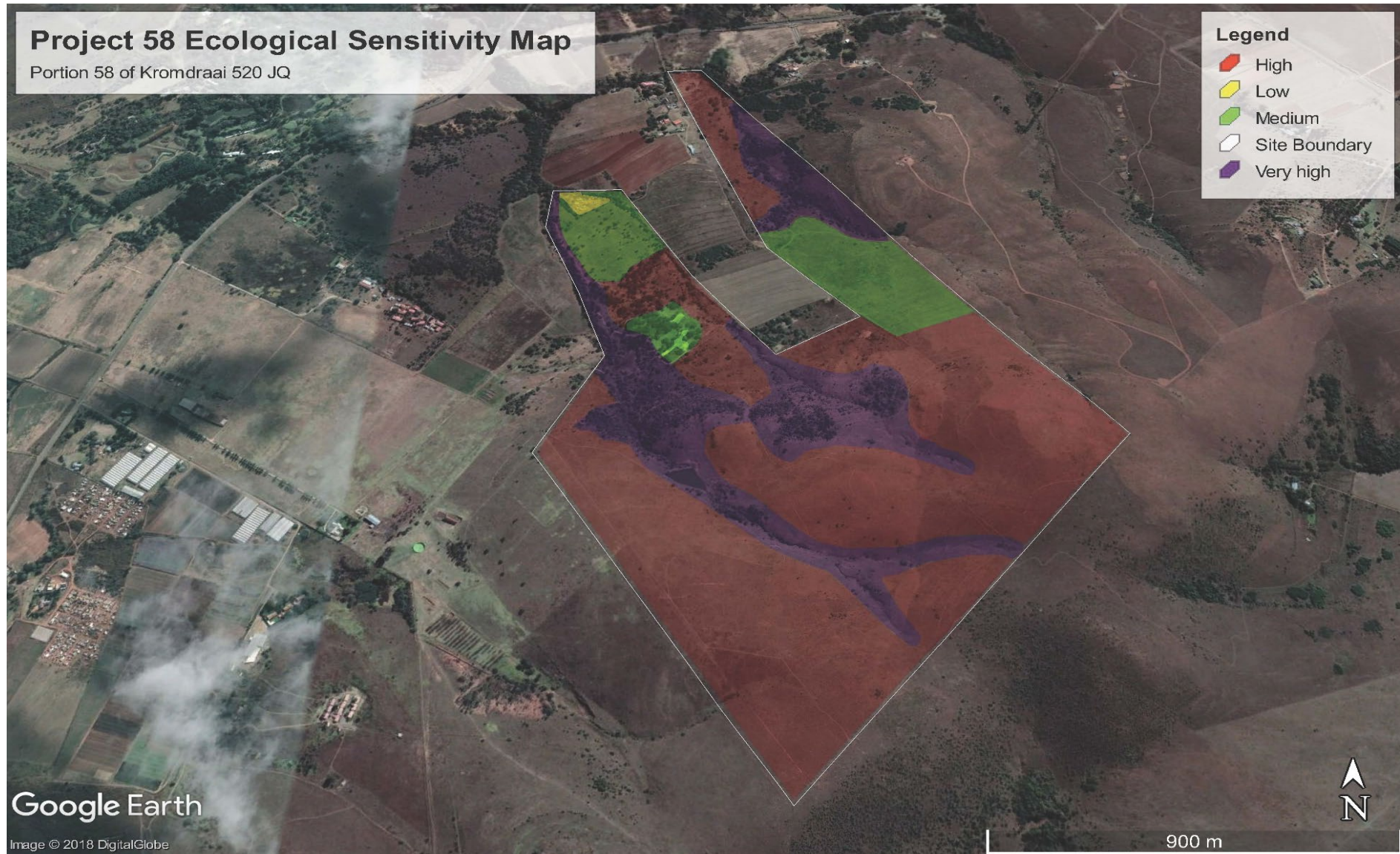


Figure 17: Ecological Sensitivity Map

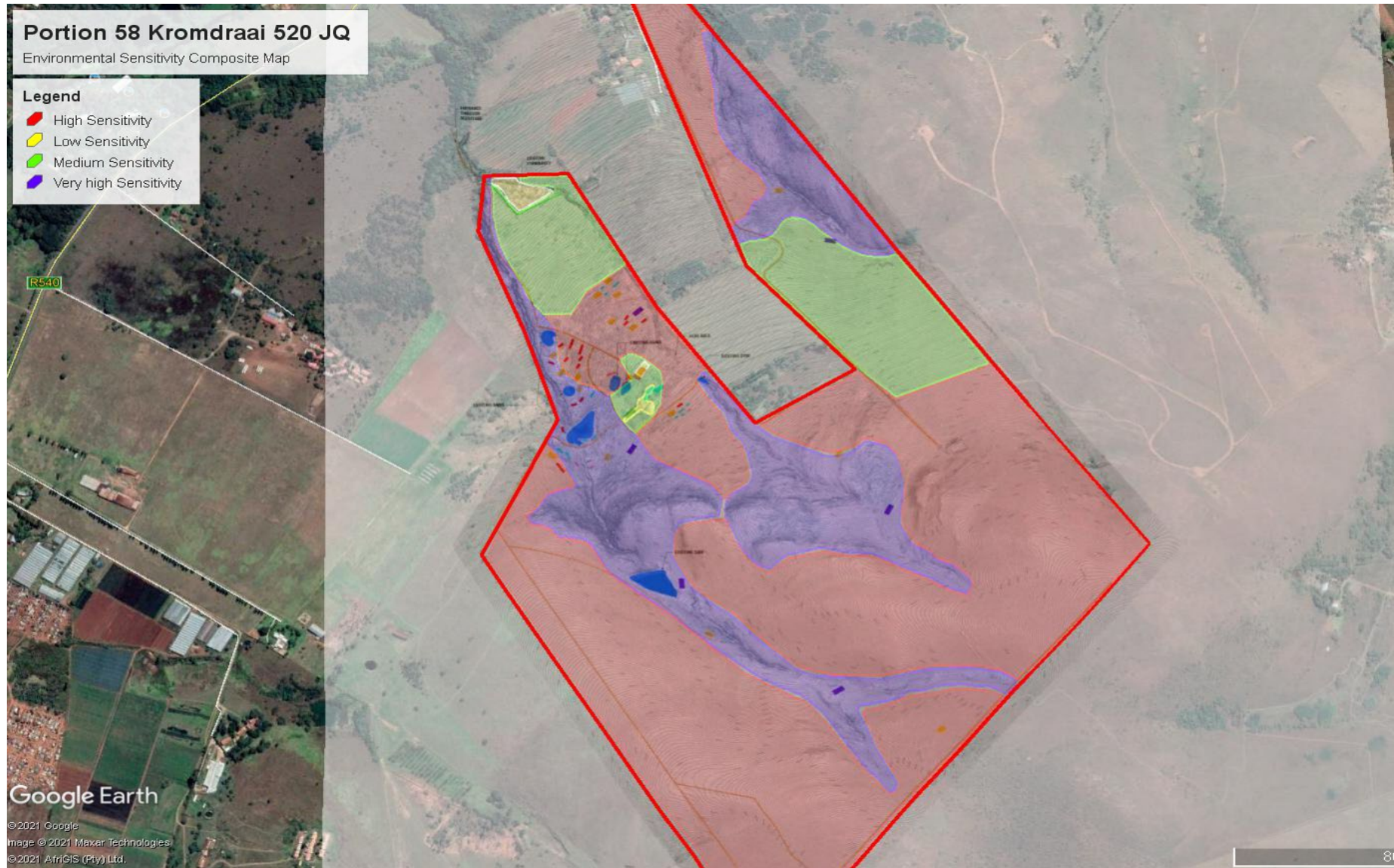


Figure 18: Environmental Sensitivity Composite Map

7.2 SOCIAL ENVIRONMENT

Refer to **Annexure F** for a Socio-Economic Impact Assessment that was undertaken by SRK. A brief summary follows:

7.2.1 SURROUNDING LAND USES

The proposed Project 58 Development falls within the West Rand District Municipality (WRDM) as well as the Mogale City Local Municipality (MCLM) Ward 39.

The Magageng community living on Portion 58 is made up of various local population groups comprising approximately 100 residents, representing 5 families in 40 households. The Applicant recognises both the Magageng community and the community living on Portion 26 (situated approximately 2km further the along the R540) as falling within their Area of Influence (Aoi).

Portion 58 was once an agricultural farm and it is understood, based on focus group discussions, that some of its current residents have lived on the farm as labour tenants. Most of the residents have, however, moved to the land as early as 1993 in search of employment opportunities in Johannesburg. The late owner of the farm, Mr Schroder granted the labour tenants permission to continue living on Portion 58 of the farm (known as Magageng Village), however, no formal title deeds have been awarded to the residents. Since the land is privately owned and zoned as agricultural, the MCLM only provides the property with basic municipal services.

The residents of both Portion 58 and Portion 26 rely on the Ward 39 councillor to act as a community leader. However, since the arrival of the project, the Portion 58 community has appointed a community representative to act on their behalf.

7.2.2 POPULATION

Between 2011 and 2016, the population of the WRDM grew from 820,994 to 838,594 (2.1%). Over the same period, the population of the MCLM grew at approximately double the rate (4.2%), from 362,420 to 383,864. For context, the South African population growth rate over the same period was 8.1%, considerably higher than that found in both WRDM and MCLM.

The population of Ward 39 in 2011 was 24,829. Ward level data on population figures was not made available by Stats SA as reported by the 2016 Community Survey, we thus assume that the population growth between 2011 and 2016 for Ward 39 is in line with the figure reported for MCLM (4.2%).

7.2.3 EDUCATION

Overall, 43.1% of the Ward 39 population have acquired a minimum of grade 12, which is substantially lower than the average within the MCLM (54%) and the WRDM (48.7%). A comparatively higher number of individuals living within Ward 39 (17.3%) have attended school up to primary school level, while 6.5% have no schooling. These statistics highlight the educational deficit experienced by many of the residents in Ward 39 and may explain why employment is found in low skilled and informal working sectors.

7.2.4 SERVICES

The majority of Ward 39 households have access to water through their own service (54.4%), which is substantially larger relative to the MCLM (5.6%) and the WRDM (5.7%). Whereas the majority of households within the MCLM (90.8%) and the WRDM (88.5%) has access to water via the municipality, a considerably smaller proportion of the Ward 39 households (39.9) receives this basic service via the municipality.

The majority of households within the MCLM gained access to electricity via in-house conventional (28.9%) and prepaid meters (56.5%), while 10.7% reported having no access to electricity.

The majority (47%) of households in Ward 39 have access to toilet facilities via ecological toilets (e.g. urine diversion; enviroloo; etc.), followed by flush toilets connected to a public sewerage system (19.8%) and pit latrine/toilets without a ventilation pipe (7.9%). Bucket toilets (collected by municipality) make up 3% of households, which is nearly three times the national average.

The majority (44.1%) of Ward 39 households get rid of their refuse via their own dump site, which is higher than the average for MCLM (6.3%) and WRDM (7.2%). This is followed by removal by local authority/private company/community members at least once a week and communal refuse dump with 33% and 6.2% respectively.

7.2.5 EMPLOYMENT AND INCOME

Household incomes shows that 53.9% of households in the Ward 39 geographic area earn below R38 400 per annum (less than R3,200 per month). There are considerably more households earning this income as compared to the MCLM (45.8%) and WRDM (43.1%). This is considered to be a low annual income and is reflective of inexpensive, labour intensive jobs, which do not require any formal education or training available in the area.

Although limited employment opportunities are expected to be created as a result of the proposed project, there are opportunities for benefit sharing. In order to manage community relations and expectations, the Community Liaison Officer (CLO) must proactively engage with the community and ensure that opportunities are communicated in a transparent manner.

7.2.6 SOCIO ECONOMIC CONCLUSION AND RECOMMENDATIONS

Overall, the positive impacts associated with the proposed project outweighs the potential negative impacts. Based on a review of the project scope, as well as through engagement with respondents from within the AoI, the project has the potential to create substantial social and economic benefits. These benefits are anticipated to flow to not only the residents of the AoI but also the Kromdraai Valley as a whole.

Based on the impacts identified and the measures that could possibly be implemented to mitigate (or enhance) these impacts, the construction of the proposed project does not pose any social fatal flaws.

Some of the key mitigation measures to be employed are discussed below and have been included in the EMPr (**Annexure H**).

Labour and skills development:

- Unskilled and unemployed labour should be sourced from the surrounding local communities (AoI) as far as possible. It is suggested that non-locals should only be hired when specialist skills, which are not available locally, are required and local business providing such skills cannot be created;
- Skills development opportunities should be granted to community members and local job seekers, where needed;

- Make use of any existing skills databases and include the local councillor (Ward 39) and other representative community structures in the process;
- Project contracts between the proponent and the principal contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks; and
- Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures.

Local procurement:

- Local suppliers should be used as far as possible; and
- Ensure that local businesses, especially those of HDSA, women and of SMMEs get allocated the maximum appropriate share of project related business opportunities.

Stakeholder engagement:

- Engagement with local communities must follow the culturally appropriate protocols in a manner that will strengthen the relationship between the client and the community;
- Effective communication must involve both engagement and feedback processes;
- A grievance mechanism, accessible to members of public, should be implemented and maintained. Such a register would provide a formal framework within which to record any comments and complaints received, as well as to identify and action appropriate mitigation and/or remediation measures. The register should also include a means of recording and communicating the close-out of issues;
- Engage with the local community representatives to dispense information relating to the project, possible employment opportunities and channels of communication (especially in terms of grievances); and
- Engagement with community representatives, ward councillors and other existing community forums should be done to inform the general public about the project and project related impacts or opportunities, especially with reference to the monitoring of impacts.

7.2.7 HERITAGE

A Heritage specialist was appointed to undertake a Phase 1 Heritage and Paleontological Assessment of the proposed site (refer to **Annexure F**). A brief summary follows:

The undulating landscape containing the fossil hominid sites of South Africa comprises dolomitic limestone ridges with rocky outcrops and valley grasslands, wooded along watercourses and in areas of natural springs. Most sites are in caves or are associated with rocky outcrops or water sources. The sites include the Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and Environs (Cradle of Humankind), and the Makapan Valley and Taung Skull Fossil Site. The Taung Skull, found in a limestone quarry at Dart Pinnacle amongst numerous archaeological and palaeontological sites south-west of the Sterkfontein Valley area, is a specimen of the species *Australopithecus Africanus*. Fossils found in the many archaeological caves of the Makapan Valley have enabled the identification of several specimens of early hominids, more particularly of *Paranthropus*, dating back between 4.5 million and 2.5 million years, as well as evidence of the domestication of fire 1.8 million to 1 million years ago. Collectively these sites have produced abundant scientific information on the evolution of modern humans over at least the past 3.5 million years. They constitute a vast reserve of scientific information, with enormous potential.

The sites contain within their deposits all of the key interrelated and interdependent elements in their palaeontological relationships. Alongside and predating the hominid period of occupation is a sequence of fossil mammals, micro-mammals and invertebrates which provide a window onto faunal evolution, palaeobiology and palaeoecology stretching back into the Pliocene. This record has come to play a crucial role in furthering our understanding of human evolution and the appearance of modern human behaviour.

The fossil evidence contained within these sites proves conclusively that the African continent is the undisputed Cradle of Humankind.

The Cradle of Humankind bears exceptional testimony to some of the most important *Australopithecine* specimens dating back more than 3.5 million years. This therefore throws light on to the origins and then the evolution of humankind, through the hominisation process.

The Cradle of Humankind is situated in unique natural settings that have created a suitable environment for the capture and preservation of human and animal remains that have allowed scientists a window into the past. Thus, this site constitutes a vast reserve of scientific data of universal scope and considerable potential, linked to the history of the most ancient periods of humankind.

Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and Environs separate components collectively contain the necessary evidence of sites where abundant scientific

information on the evolution of modern humans over the past 3.5 million years was uncovered. Furthermore, the nominated serial site covers an area big enough to constitute a vast reserve of scientific information, with enormous potential.

The sites contain within their deposits all of the key interrelated and interdependent elements in their natural palaeontological relationships. Thus, the breccia representing the cave fillings contains the fossilised remains of hominids, their lithicultural remains (from about 2.0 million years onwards), fossils of other animals, plants and pollen, as well as geochemical and sedimentological evidence of the conditions under which each member of the deposits was laid down. They represent a succession of palaeo-ecosystems. The caves, breccias and strata from which quantities of fossils or tools have been extracted, together with the landscape are generally intact, but are vulnerable to development pressures, villagers' use of the environment and tourism.

In the 1820's the area was affected by the disruptive influence of Mzilikazi (Zulu warrior) and later during the middle and late 19th century the area was settled in by white farmers which resulted in the establishment of fenced farms and formal towns.

The following observations and recommendations were made by the Heritage Specialist:

- The proposed site does not contain any surface archaeological deposits, a possible reason is previous agricultural and infrastructure development.
- The possibility of sub-surface findings always exists and should be taken into consideration in the Environmental Management Programme.
- If sub-surface archaeological material is discovered work must stop and a heritage practitioner preferably an archaeologist contacted to assess the find and make recommendations.
- The site does contain marked graves or burial grounds. The possibility of graves not visible to the human eye always exists and this should be taken into consideration in the Environmental Management Plan.
- It is important to note that all graves and cemeteries are of high significance and are protected by various laws. Legislation with regard to graves includes the National

Heritage Resources Act (Act 25 of 1999) whenever graves are 60 years and older. Other legislation with regard to graves includes those when graves are exhumed and relocated, namely the Ordinance on Exhumations (no 12 of 1980) and the Human Tissues Act (Act 65 of 1983 as amended).

- If sub-surface graves are discovered work should stop and a professional preferably an archaeologist contacted to assess the age of the grave/graves and to advise on the way forward.
- It is recommended that an accidental fossil find protocol be drafted and endorsed by the responsible official/s at Maropeng;
- The construction project manager and workers be sufficiently briefed to identify fossils and to report accidental findings immediately to the Environmental Control Officer (ECO);
- Individual grave and cemetery must be fenced and maintained;
- Other than the above there are no visible restrictions or negative impacts in terms of heritage associated with the site;
- In terms of heritage the proposed project may continue; and
- The discovery of subsurface archaeological and/or historical material as well as graves must be taken into account in the Environmental Management Programme.
- In terms of the Heritage Resources Act, 1999 (Act 25 of 1999) [NHRA] Section 38 approval must be obtained from SAHRA prior to commencement.

7.2.8 VISUAL

The proposed site generally slopes to the north-west with gradual upper slopes and steep mid slopes. Three natural gullies formed by non-perennial drainage line run south to north towards the Bloubankspruit.

Most of the site is covered by natural grassveld but in the gullies denser trees and shrubs are present. The north-western parts of the site have some structures, such as houses and farm buildings that are surrounded by lawns and larger trees.

The proposed facilities are mostly concentrated on the existing development footprint with new facilities proposed in lower laying areas amongst dense vegetation.

From the conceptual images (see **Figure 19**) it is clear that the proposed structures will use natural materials to blend in with its surroundings and will also be positioned sensitively in the landscape with minimal disturbance to surrounding vegetation and limited change to the landscape character and sense of place.



Figure 19: Conceptual images of proposed structures

Due to the type of development, vast viewing distance, the adulating landscape and dense vegetation associated with areas earmarked for development the site's ability to absorb changes to landscape will be high. The visual impact visual receptors such as adjacent residents and motorists traveling along the R540 and R374 can therefore be considered as LOW.

7.2.9 AIR QUALITY

It is expected that there will be an increase in noise and dust exposure for the Magageng community and other adjacent landowners due to the associated activities. Construction sites and their associated activities could cause pollution or environmental degradation. These impacts are project specific and can range in type and magnitude, such as noise, odour, dust as vibration. The construction activities are expected to result in higher or more frequent

occurrences of traffic when heavy duty vehicles use roads located close to the Magageng community. This may lead to a decrease in the air quality.

Increased dust levels are expected due to project activities and will be augmented by the prevailing winds. As part of the management measures the project's Community Liaison Officer (CLO) should engage with the heads of households of the Magageng community. The CLO should also raise awareness amongst the Magageng community on the available grievance mechanisms to be used.

Increased noise levels due to project activities are expected but, are anticipated to be low. Some impacts may be as a result of subjective and value-based knowledge and may not necessarily be measured in quantifiable or scientific terms. Subjective impacts refer to the way in which people experience or perceive an impact (i.e. value based knowledge). As part of the mitigation measures, the CLO should engage with the community to gauge the subjective impacts of noise.

Construction and operational dust and noise mitigation measures have been included in the EMPr (**Annexure H**).

7.2.10 TRAFFIC

WSP was appointed to undertake a Site Traffic Assessment (STA) for a proposed development (**Annexure D**)

Access to the study site is currently provided via two right-of-way servitudes registered over Portions 17 and 22 of the farm Kromdraai 520-JQ. Due to substandard intersection spacing and safety concerns at the access to the west (located near to the R374/R540 intersection), the access road over Portion 17 of the farm Kromdraai 520-JQ is proposed to be closed and not be used to access the subject development.

A formal access to the development is proposed to be constructed at the existing eastern access off the R374. It is also proposed that the existing access to the Kenjara Lodge (located on Portion 37 of the farm Kromdraai 520-JQ) be consolidated with this new access. This proposed access arrangement for the development is shown in **Figure 20**.



Figure 20: Proposed New Access

The following observations and recommendations were made by the Traffic Impact Specialist:

- **Trip Generation:** The development is expected to generate 101 trips (in and out) during the critical peak traffic hour;
- **Site Access:** Access to the study site is currently provided via two right-of-way servitudes registered over Portions 17 and 22 of the farm Kromdraai 520-JQ. A formal access to the development is proposed to be constructed at the existing eastern access off the R374.
- **On-Site Traffic Circulation:** The 164-hectare site provides ample of space and formal and informal roads for normal passenger vehicles, delivery vehicles and emergency vehicles to manoeuvre without a risk of affecting traffic flow on external roads or restrict access for emergency vehicles.
- **On-Site Parking:** Similar to on-site traffic circulation, on-site parking is also not expected to be an issue due to the location and size of the property. The proposed SDP do not provide detailed information on the number of parking to be provided. Parking as per the relevant town planning scheme should be provided for each landuse applied for in the consent use application to be submitted. It is proposed that parking provision be controlled during the building plan submission stage, and
- **Non-motorised and Public Transport:** Except for some staff that might make use of public or non-motorised transport to travel to and from the development, Project 58 is not expected to generate any significant demand for these services and facilities. No

external non-motorised or public transport facilities are therefore recommended. Due to the nature of the development no on-site non-motorised and public transport facilities are also recommended.

- The subject development is supported from a traffic engineering viewpoint, provided that the recommendations made in this report are implemented.

8. IMPACT ASSESSMENT METHODOLOGY

8.1.1 ASSESSMENT CRITERIA

In order to assess the impacts effectively, the project will be divided into two phases: Construction and Operational.

The activities arising from each of these phases will be included in the impact assessment tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The assessment of the impacts will be conducted according to a synthesis of criteria (**Table 5**) required by the integrated environmental management procedure.

Table 5: Impact Assessment Criteria

Extent The physical and spatial scale of the impact.	Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
	Site	The impact could affect the whole, or a significant portion of the site.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
	National	The impact could have an effect that expands throughout the country (South Africa).
	International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.

<p>Duration</p> <p>The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.</p>	Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
	Short-Medium Term	The impact will be relevant through to the end of a construction phase.
	Medium Term	The impact will last up to the end of the development phases, where after it will be entirely negated.
	Long Term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
<p>Intensity</p> <p>Is the impact destructive or benign, does it destroy the impacted environment, alters its functioning, or slightly alter the environment itself?</p>	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
<p>Probability</p> <p>The likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.</p>	Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).
	Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.
	Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.
	Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.
	Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

8.1.2 APPROACH TO THE ASSESSMENT OF CUMULATIVE IMPACTS

Cumulative impacts can arise from one or more activities. A cumulative impact may result in an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

Identified cumulative impacts of the project are evaluated in the BAR phase.

8.1.3 MITIGATION AND MANAGEMENT

Mitigation measures should be recommended in order to enhance benefits and minimise negative impacts. The following will be addressed:

- Mitigation objectives;
- Recommended mitigation measures;
- Effectiveness of mitigations measures; and
- Recommended monitoring and evaluation programme.

8.2 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The EMPr informs the Applicant and the technical team of the guidelines which will need to be followed during construction to ensure that there are no lasting or cumulative negative impacts of the construction process on the environment. This includes:

- The standards and guidelines that must be achieved in terms of environmental legislation;
- Mitigation measures and environmental specifications which must be implemented for all phases of the project to minimise the extent of environmental impacts, to manage environmental impacts and where possible to improve the condition of the environment;
- Guidance through method statements that are required to be implemented to achieve the environmental specifications;
- Corrective actions that must be taken in the event of non-compliance with the specifications of the EMPr; and
- Measures to prevent long-term or permanent environmental degradation.

The EMPr is available as part of the Draft BAR (**Annexure H**).

9. IDENTIFIED IMPACTS

9.1 POTENTIAL ENVIRONMENTAL ISSUES AND IMPACTS

The environmental issues and resulting impacts that have been identified for all phases of the project are provided below. The identification of these impacts resulted the recommendation of specialist assessments. These identified impacts were identified during the notification phase and will now be assessed further as part of the BAR phase (**Section 9**). Appropriate mitigation measures will be recommended in order to reduce the significance of these potential impacts.

9.1.1 BIOPHYSICAL IMPACTS

- Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage (*during the construction, operational phases*);
- Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste (*during the construction, operational phases*);
- Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surfaces (*during the construction and operational phases*);
- Potential impacts on vegetation and loss of habitat (*during the construction and operational phase*).
- Potential impacts on the availability of groundwater (*during the construction and operational phase*).

9.1.2 SOCIO-ECONOMIC IMPACTS

- Impacts on ambient air quality dust and noise generation (*during the construction, operational phases*);
- Change in the visual character of the area (*during the construction, operational phases*);
- Potential impacts on existing cultural and heritage resources (*during the construction phase*);
- Potential impacts on traffic (*during the construction and operational phases*);

- Economic development, tourism growth and job creation (*during the construction and operational phases*); and

9.1.3 CUMULATIVE IMPACTS

- Increased development on ridges in Gauteng and loss of sensitive vegetation and high biodiversity associated with ridges.

9.2 ALTERNATIVES ASSESSED

Based on the initial assessment of alternatives, the following alternatives will be assessed in the BAR Phase:

- Alternative 1: Proposed Activity
- Alternative 2: Technology Alternative
- No-Go Alternative

9.2.1 MITIGATION AND MANAGEMENT

Mitigation measures should be recommended in order to enhance benefits and minimise negative impacts. The following will be addressed:

- Mitigation objectives;
- Recommended mitigation measures;
- Effectiveness of mitigations measures; and
- Recommended monitoring and evaluation programme.

10. IMPACT ASSESSMENT

The potential negative environmental impacts of the Proposed Activity were assessed and the impact significance were determined using criteria as set out in the guideline document: DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria. A key of numeric values and the formula used is provided below for ease of reference:

Probability:	P	Duration:	D
Definite	5	Permanent	5
Highly probable	4	Long-term (15 yrs till operation ceases)	4
Medium probability	3	Medium-term (5 - 15yrs)	3
Low probability	2	Short-term (0 - 5 yrs)	2
Improbable	1	Immediate	1
None	0		

Scale:	S	Magnitude:	M
International	5	Very high	10
National	4	High	8
Regional	3	Moderate	6
Local	2	Low	4
Site only	1	Minor	2
		None	0

Significance:	
SP ≤ 30	LOW
31 ≤ SP ≤ 60	MEDIUM
SP ≥ 61	HIGH

Formula: $SP = (P+D+S) \times M$

SBM	=	Significance Before Mitigation
SAM	=	Significance After Mitigation

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures	
	P	D	S	M			
10.1.1 Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> Choice of site for the Contractor’s storage area requires the ECO’s approval and must consider ecologically sensitive areas, including flood and drainage lines. A site plan/layout (indicating areas for storage of hazardous chemicals, ablution facilities, waste yards, etc.) must be submitted to the ECO for approval. Storage areas must be designated, demarcated and fenced/secured (in the case of hazardous materials). A walled concrete platform, dedicated store with adequate flooring or bermed (110% capacity) area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. Clear signage must be placed at all storage areas containing hazardous materials/substances. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible, the available MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. Storage of potentially hazardous materials should be above any 100-year flood line, or as agreed with the ECO. Sufficient care must be taken when handling hazardous materials/substances to prevent pollution. Staff dealing with these hazardous materials/substances must be aware of their potential impacts and follow the appropriate safety measures. Concrete or cement are not to be mixed on bare soil but only in a suitable mixing tray.
	4	2	2	8	SBM=	64	
	4	2	2	6	SAM=	48	
	Alternative 2: Technology Alternative						
	4	2	2	8	SBM=	64	
	4	2	2	6	SAM=	48	

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> • All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site at a licenced hazardous waste site. • Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; • Portable septic toilets are to be provided and maintained for construction crews. Maintenance must include their removal without sewage spillage. • Portable septic toilets are to be located outside of the 1:100 year floodline. • Spilled hydrocarbons shall be treated with oil absorbent such as Drizit or similar and this material should be disposed at an approved waste site. • Topsoil or soil polluted by hazardous substances or cement should also be disposed at an approved waste site. • In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Human Settlements Water and Sanitation (DHSWS) must be informed immediately. • Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEFF as stipulated in the conditions of the Environmental Authorisation. • Keep written records detailing the necessary information regarding the spill and remedial measures implemented. Such

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
							progress reporting is important for monitoring and auditing purposes and the written reports may afterwards be used for training purposes to prevent similar future occurrences.
10.1.2 Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> The contractor must have a waste policy and waste management procedure and engage a service provider who trains the operations staff on measures for implementing the plan as well as auditing. Adequate waste management measures must be implemented preventing possible illegal dumping and littering of adjacent sensitive areas. The excavation and use of rubbish pits are forbidden. A fenced area must be allocated for waste sorting and disposal. Individual skips for different types of waste should be provided. Conduct ongoing staff awareness programs so as to reinforce the need to avoid littering. Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed. Waste bins should be cleaned out on a weekly basis by an appointed service provider to prevent any windblown waste and/or visual disturbance. The construction site should be cleaned daily and litter removed. Different waste bins, for different waste streams must be provided to ensure correct waste separation. Bins should be clearly marked and lined for efficient control and safe disposal of waste.
	4	2	1	8	SBM=	56	
	4	2	1	6	SAM=	42	
	Alternative 2: Technology Alternative						
	4	2	1	8	SBM=	56	
	4	2	1	6	SAM=	42	

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> • A fenced area must be allocated for waste sorting and disposal on the site. • General waste produced on site is to be collected in skips for disposal at the local municipal waste site. A waste disposal service provider must be appointed by the contractor to carry out disposal of waste as required. Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site. • Under no circumstances is waste to be burnt or buried on site. • A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. • In the case of a spill of hydrocarbons, chemicals or bituminous substance, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity. • Reporting of spills and mitigation done must be done in accordance with section 10 of the minimum requirements for the handling, classification and disposal of hazardous waste (3rd edition, 2005). • Vehicles are to be checked for leakage before and after entering the construction area.

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
10.1.3 Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surfaces.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> • A Stormwater Management Plan must be approved prior to construction commencing. • Clearing activities and earth scraping should preferably be restricted to the dry season in order to prevent erosion and siltation of the adjacent non-perennial drainage lines. • As much vegetation as possible should remain on site wherever possible to help decrease surface water flow velocity, and increase filtration. • Soil stockpiling areas must follow environmentally sensitive practices and be situated a sufficient distance away from drainage areas. • The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site. • Stockpiles must not exceed more than 2m in height. • Any stockpile stored for long periods must be retained in a bermed area. • Backfill must be compacted to form a stabilised and durable blanket. • Topsoil must be reused where possible to rehabilitate disturbed areas to facilitate re-growth of species that occur naturally in the area. • Stockpiled topsoil should be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious weeds, which would adversely affect its suitability for planting. • Where excessive loose sediment is created, attenuation swales and / or soils screens should be installed.
	4	2	3	8	SBM=	72	
	4	2	3	6	SAM=	54	
	Alternative 2: Technology Alternative						
	4	2	3	10	SBM=	90	
	4	2	3	8	SAM=	72	

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
							<ul style="list-style-type: none"> Ensure silt fences and sediment curtains are inspected on a weekly basis and after any rainfall events exceeding 10mm. Where soils have been compacted, these should be loosened to a depth of 30cm. All erosion control mechanisms need to be regularly maintained. After construction, the site should be contoured to ensure free flow of runoff and to prevent ponding of water. Drainage must be controlled to ensure that runoff from the site will not culminate in off-site pollution or result in rill and gully erosion in the non-perennial drainage lines.
<ul style="list-style-type: none"> Potential impacts on vegetation and loss of habitat 	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> Access to the non-perennial drainage lines (including a 30-meter buffer) must be zoned as “no-go” during the construction phase (except for implementation of approved stormwater infrastructure). Provision of adequate toilet facilities must be implemented to prevent the possible contamination of ground (borehole) water in the area. All temporary stockpile areas, litter and dumped material and rubble must be removed on completion of construction. All alien invasive plant and tree species should be removed from the site to prevent further invasion. Vegetation clearance should be restricted to the areas under construction allowing remaining animals opportunity to move away from the disturbance. No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site.
	4	2	3	8	SBM=	72	
	4	2	3	6	SAM=	54	
	Alternative 2: Technology Alternative						
	4	2	3	10	SBM=	90	
	4	2	3	8	SAM=	72	

10.1 CONSTRUCTION PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> No hunting with firearms (shotguns, air rifles or pellet guns) or catapults should be permitted on the property as well as neighbouring areas.
<ul style="list-style-type: none"> Potential impacts on the availability of groundwater. 	Alternative 1: Proposed Activity					
	4	2	3	8	SBM=	72
	4	2	3	6	SAM=	54
	Alternative 2: Technology Alternative					
	4	2	3	8	SBM=	72
	4	2	3	6	SAM=	54
						<ul style="list-style-type: none"> Water storage and harvesting infrastructure must be implemented prior to commencement of construction. Groundwater monitoring (yield and quality) of the five existing boreholes should be carried out on a monthly basis during the construction period. If the yield reduces dramatically due to the extra demand of water during the construction phase a new water resource should be secured. All boreholes should be registered with the Department of Human Settlements, Water and Sanitation.

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
10.2.1 Impacts on ambient air quality (dust and noise generation).	Alternative 1: Proposed Activity					
	4	2	2	6	SBM=	48
	4	2	2	4	SAM=	32
	Alternative 2: Technology Alternative					
	4	2	2	6	SBM=	48
	4	2	2	4	SAM=	32
						<p><u>Air Quality</u></p> <ul style="list-style-type: none"> Implement a programme of stakeholder communication that includes community engagement before and during work on site. Provide a complaint register on site where complaints can be made. This register should enable effective communication of complaints details of steps taken to resolve complaints.

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> Clearly display the contact details of the environmental site office and manager at the site entrance. Weekly site inspections should be undertaken in the vicinity of sensitive receptors. Records should be made of these routine inspections. Implement and maintain a Dust and Emission Management Plan which provides clear details on preventing, maintaining and improving the air quality in terms of site-specific activities. This plan could possibly incorporate a dust fallout monitoring programme should it be evident that dust emissions is a problem. Should activities be undertaken during dry and windy conditions, special focus must be taken on the impact and results of the conditions to ensure that minimal impact is occurring. Should the conditions require it, erect screens and barriers around the sensitive receptors. Ensure that all areas, fencing, barriers and scaffolding is kept clear of debris and dust. Ensure that all areas, fencing, barriers and scaffolding is kept clear of debris and dust. Ensure that all vehicles are maintained in good working condition and that they are services on regular intervals. Ensure that all vehicles are switched off when stationary- no vehicles should be idling for extended period. Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. Impose and regulate a speed limit of 30 km/h on the site at all times.

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust particulate matter suppression (non-potable water) where possible. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. • Only use registered waste carriers to take waste off-site. • Bonfires and burning of waste materials is prohibited. • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Only remove the cover in a small area during work and not all at once. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in appropriate storage with suitable emission control systems to prevent escape of material and overflowing during delivery. • For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as soon as practicable any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport • Record all inspections of haul routes and any subsequent action in a site log book. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable <p><u>Noise:</u></p> <ul style="list-style-type: none"> • Construction site yards and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development site. • All construction vehicles and equipment are to be kept in good repair. • Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20dBA. • Portable acoustic shields should be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators).

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
							<ul style="list-style-type: none"> Construction activities should be limited to 07:00 to 17:00 daily. Machines in intermittent use should be shut down in the intervening periods between active working or throttled down to a minimum. In general, construction activities should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment.
10.2.2 Change in the visual character of the area.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> Locate the construction camps in areas that are already disturbed or where it is not necessary to remove established vegetation; Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth of at least 20% density and at least 3 metres high, as an additional screen; Exposed soil must be covered or 'camouflaged' using a biodegradable soil mat and vegetation cover to reduce the duration of visible scarring of the landscape; Retain the existing vegetation cover of the site through selective clearing, where practical; Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agent; Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements;
	4	2	2	6	SBM=	48	
	4	2	2	2	SAM=	16	
	Alternative 2: Technology Alternative						
	4	2	2	6	SBM=	48	
	4	2	2	2	SAM=	16	

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
							<ul style="list-style-type: none"> Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and Monitor all areas for rehabilitation failure and implement remedial action immediately.
10.2.3 Potential impacts on existing cultural and heritage resources.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> If an artefact or grave on site is uncovered, work in the immediate vicinity must be stopped immediately. The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Client or ECO of such discovery. An Archaeologist will need to be contacted for the way forward. Work may only resume once clearance is given in writing by the appointed Archaeologist. Section 38 approval in terms of the NHRA must be obtained from SAHRA prior to commencement.
	4	2	2	8	SBM=	64	
	4	2	2	6	SAM=	48	
	Alternative 2: Technology Alternative						
	4	2	2	8	SBM=	64	
	4	2	2	6	SAM=	48	
10.2.4 Potential impacts on traffic in the area.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> Place adequate advance warnings (Turning Trucks) along the R540. Manage the increase in construction traffic in terms of congestion, road surface damage, safety concerns, dust and erosion. All vehicular traffic on site should adhere to farm road safety measures; All vehicles should be road worthy;
	2	2	2	6	SBM=	36	
	2	2	2	4	SAM=	24	
	Alternative 2: Technology Alternative						
	2	2	2	6	SBM=	36	
	2	2	2	4	SAM=	24	

10.2 CONSTRUCTION PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
						<ul style="list-style-type: none"> • Only designated roads should be used for construction vehicles; • Ensure drivers and operators of equipment are familiar with the safety policies and regulations.

10.3 OPERATIONAL PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
10.3.1 Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> • Access to the non-perennial drainage lines must be limited to low-impact activities during daylight hours (hiking, bird-watching, meditation and relaxation). • All maintenance vehicles should be kept in good working condition; • Spilled hydrocarbons shall be treated with oil absorbent such as Drizit or similar and this material should be disposed at an approved waste site. • All maintenance vehicles should be parked in demarcated areas when not in use and drip trays should be placed under vehicles to collect any spillages/ leaks; • In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Human Settlements Water and Sanitation (DHSWS) must be informed immediately.
	3	5	2	8	SBM=	80	
	3	5	2	6	SAM=	60	
	Alternative 2: Technology Alternative						
	3	5	2	8	SBM=	80	
	3	5	2	6	SAM=	60	
10.3.2 Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> • Waste must be stored in suitable containers (not on bare soil) until collection. • Storage containers must have lids to prevent any windblown waste and/or accessibility to wild animals. • Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site.
	3	5	2	6	SBM=	60	
	3	5	2	2	SAM=	20	
	Alternative 2: Technology Alternative						
	3	5	2	6	SBM=	60	
	3	5	2	2	SAM=	20	

10.3 OPERATIONAL PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
10.3.3 Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surfaces	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> • Vehicular and pedestrian movement must be limited to the established roads and footpaths. • If any signs of erosion occur in high trafficked areas or as a result of concentrated flow of stormwater runoff these areas should be rehabilitated according to instructions from a qualified Ecologist. • All alien invasive tree species should be replaced with indigenous (to the area) species. Introduced indigenous tree species must be sourced from a local nursery in order to prevent possible genetic contamination.
	3	5	2	8	SBM=	80	
	3	5	2	4	SAM=	40	
	Alternative 2: Technology Alternative						
	3	5	2	8	SBM=	80	
	3	5	2	4	SAM=	40	
10.3.4 Potential impacts on vegetation and loss of habitat	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> • Landscaped areas around the proposed development should be planted with indigenous (preferably using endemic or local species from the area) grasses, forbs, shrubs and trees, which are water wise and require minimal horticultural practices. A species list of suitable species should be compiled for the property owner. • A Re-vegetation and Rehabilitation Manual should be prepared for the use of contractors, landscape architects and groundsmen. Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited.
	3	5	2	8	SBM=	80	
	3	5	2	6	SAM=	60	
	Alternative 2: Technology Alternative						
	3	5	2	8	SBM=	80	
	3	5	2	6	SAM=	60	
10.3.5 Potential impacts on the availability of groundwater.	Alternative 1: Proposed Activity						<ul style="list-style-type: none"> • Groundwater monitoring (yield and quality) of the five existing boreholes should be carried out on a quarterly basis during the operational period. • If the yield reduces dramatically due to the extra demand of water during the operational phase a new water resource should be secured.
	3	5	2	8	SBM=	80	
	3	5	2	6	SAM=	60	
	Alternative 2: Technology Alternative						
	3	5	2	8	SBM=	80	

10.3 OPERATIONAL PHASE NEGATIVE IMPACTS (BIOPHYSICAL IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
	3	5	2	6	SAM=	60	<ul style="list-style-type: none"> All should be registered with the Department of Human Settlements, Water and Sanitation. Water saving techniques should be implemented, these include: <ul style="list-style-type: none"> Rainwater harvesting; Grey water separation; Water recycling (irritation with treated water); Water meters should be fitted and monitored for the detection of leaks, and Staff and guest awareness (save water where possible)

10.4 OPERATIONAL PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)							
Potential Impact	Occurrence		Severity		Significance		Recommended Mitigation Measures
	P	D	S	M			
10.4.1 Impacts on ambient air quality (dust and noise generation).	Alternative 1: Proposed Activity						<p><u>Dust:</u></p> <ul style="list-style-type: none"> Provide a complaint register on site where complaints can be made. This register should enable effective communication of complaints details of steps taken to resolve complaints. Bonfires and burning of waste materials is prohibited. <p><u>Noise:</u></p> <ul style="list-style-type: none"> Maintenance activities should be limited to 07:00 to 17:00. Machines in intermittent use should be shut down in the intervening periods between active working or throttled down to a minimum. In general, operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).
	3	5	2	4	SBM=	40	
	3	5	2	2	SAM=	20	
	Alternative 2: Technology Alternative						
	3	5	2	4	SBM=	40	
	3	5	2	2	SAM=	20	

10.4 OPERATIONAL PHASE NEGATIVE IMPACTS (SOCIO-ECONOMIC IMPACTS)						
Potential Impact	Occurrence		Severity		Significance	Recommended Mitigation Measures
	P	D	S	M		
10.4.2 Change in the visual character of the area.	Alternative 1: Proposed Activity					
	5	3	2	4	SBM=	40
	5	3	2	2	SAM=	20
	Alternative 2: Technology Alternative					
	5	3	2	8	SBM=	80
	5	3	2	6	SAM=	60
10.4.3 Potential impacts on traffic in the area.	Alternative 1: Proposed Activity					
	5	3	2	4	SBM=	40
	5	3	2	2	SAM=	20
	Alternative 2: Technology Alternative					
	5	3	2	4	SBM=	40
	5	3	2	2	SAM=	20

- Natural trees, shrubbery and grass species must be retained wherever possible;
- Trees with good screening properties must be utilised in sections where direct views are visible.
- The ecologist must approve the tree species to be utilised for screening purposes.
- Structures must be painted using earthy colours to blend in with ridgeline and vegetation;
- Treat all steelwork with a matt paint to limit reflection;
- Be sensitive towards the use of glass or materials with a high reflectivity to avoid glare from the shiny surfaces and to avoid visual discomfort for viewers during the day;
- Deflect all external lighting downwards, and
- Maintain the facility to a high standard (buildings as well as landscaping).

- All vehicular traffic on site should adhere to road safety measures.
- Servitudes registered over Portions 17 and 22 of the farm Kromdraai 520-JQ. A formal access to the development is proposed to be constructed at the existing eastern access off the R374.

10.5 CUMULATIVE IMPACT

A cumulative impact: *“Increased development on ridges in Gauteng and loss of sensitive vegetation and high biodiversity associated with ridges”* was identified.

Due to the high sensitivity associated with ridges in Gauteng, the cumulative impact of the Proposed Activity in conjunction with existing development on ridges in Gauteng is Very High. The only way to truly mitigate this cumulative impact is through adoption of the No-Go Alternative.

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The EMPr informs the Applicant and the technical team of the guidelines which will need to be followed during construction to ensure that there are no lasting or cumulative negative impacts of the construction process on the environment. This includes:

- The standards and guidelines that must be achieved in terms of environmental legislation;
- Mitigation measures and environmental specifications which must be implemented for all phases of the project to minimise the extent of environmental impacts, to manage environmental impacts and where possible to improve the condition of the environment;
- Guidance through method statements that are required to be implemented to achieve the environmental specifications;
- Corrective actions that must be taken in the event of non-compliance with the specifications of the EMPr; and
- Measures to prevent long-term or permanent environmental degradation.

The EMPr is available as part of the Draft BAR (**Annexure H**).

12. EAP'S RECOMMENDATION

12.1.1 COMPARATIVE ASSESSMENT OF ALTERNATIVES

Although a number of potential short and long-term environmental and social impacts can be expected during the construction and operational phases of the Proposed Activity, it was found that the significance of these impacts could be reduced through the successful implementation of appropriate mitigation measures. Refer to **Table 6** for a comparative assessment of alternatives. Alternative 1 is preferred over Alternative 2 for the following reasons:

Vegetation Clearance

For Alternative 1 the TF PV cells can be attached to roofs of proposed structures at an optimal angle and would not require any additional vegetation clearance for associated solar infrastructure.

For Alternative 2 the CSP Dish units will have to be placed on the ground on a north-facing slope and the footprint area will have to be cleared. From a vegetation clearance point of view Alternative 1 is preferred over Alternative 2.

Visual

The TP PV cells associated with Alternative 1 is non-reflective and visual receptors will not experience any glare effect produced by these cells. The CSP Dish units proposed in Alternative 2 however is lined with mirrors and is more likely to produce a glare effect. From a visual point of view Alternative 1 is preferred over Alternative 2.

Table 6: Comparative Assessment of Impact Significance After Mitigation

Construction Phase Impacts	Significance after Mitigation	
	Alternative 1	Alternative 2
Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage	Medium	Medium
Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste.	Medium	Medium
Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surface	Medium	High
Potential impacts on vegetation and loss of habitat	Medium	High

Construction Phase Impacts	Significance after Mitigation	
	Alternative 1	Alternative 2
Potential impacts on the availability of groundwater	Medium	Medium
Impacts on ambient air quality dust and noise generation	Medium	Medium
Change in the visual character of the area	Low	Medium
Potential impacts on existing cultural and heritage resources	Medium	Medium
Potential impacts on traffic	Low	Low
Economic development, tourism growth and job creation	High Positive	

Operational Phase Impacts	Significance after Mitigation	
	Alternative 1	Alternative 2
Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage	Medium	Medium
Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste	Low	Low
Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surface	Medium	Medium
Potential impacts on vegetation and loss of habitat	Medium	Medium
Potential impacts on the availability of groundwater	Medium	Medium
Impacts on ambient air quality dust and noise generation	Low	Low
Change in the visual character of the area	Low	Medium
Potential impacts on traffic	Medium	Medium
Economic development, tourism growth and job creation	High Positive	

Although CSP is superior in its ability to be stored the TF PV cells is a better technology for this particular proposed development. Eskom supplies the property with power and as solar energy will only be used to supplement electricity and the storage thereof is therefore not a priority.

The benefits that the TF PV cells offer in terms of its positioning (on roofs of structures therefore no vegetation clearance) as well as limited glare effect associated with this technology results in a lower overall negative impact and Alternative 1 is therefore preferred over Alternative 2.

The EAP therefore recommends that Alternative 1 should be authorised by DEFF as the significance of the negative impacts, after mitigation, is lower than Alternative 2 taking into account, development vegetation clearance and visual impacts.

12.1.2 EAP'S STATEMENT

The EAP acknowledges that the Proposed Activity is located within one of the most sensitive locations in Gauteng, namely the core of the Cradle of Humankind World Heritage Site, and that any form of development by its nature could impact negatively on the receiving environment. Besides evidence of historical agricultural activities and associated infrastructure the proposed site is in pristine condition which should be conserved as far as possible.

Taking into account the above one has to consider that the type of development that is proposed by the Applicant in this application is not the conventional type of development generally associated with negative environmental impacts of a high significance. With "regeneration and sustainability" as a core concept the Proposed Activity is sympathetic to the environment and is based on a human connection with nature rather than dominance over nature. This is evident from the type of facilities that is proposed as well as the construction materials and off- the grid technology that will be utilised (as outlined in Section 2).

The GPEMF states that activities such as boutique hotels and lodges as well as tourism incentive accommodation is desirable within the core of the CHKWHS. The Proposed Activity clearly falls within this category and is therefore in line with the GPEMF.

Tourism is a major contributor to the South African economy and although it is currently under pressure as a result of the Covid-19 pandemic the tourism sector needs to grow in line with governments target of attracting 21 million international tourists by 2030. The Proposed Activity is located in an area of international importance and will be able to assist in achieving this target. As concluded in the SIA (**Annexure F**) and with specific reference to the local Magageng community the Proposed Activity will also stimulate economic development, skills development and generate employment opportunities in an area much needed.

Due to the overall medium to low significance of negative environmental impacts that the Proposed Activity will have on the receiving environment after adequate mitigation has been implemented and the high positive impact it will have on economic development, employment

and tourism, the EAP is of the opinion that the DEFF should authorise Alternative 1: Proposed Activity.

Should Environmental Authorisation be granted, it should be subject to the following conditions:

- All mitigation measures in **Section 10** of the Draft BAR and recommendations made by the specialist studies (**Annexure F**) should be adhered to during the Construction and Operational Phases of the development;
- All recommendations and mitigation measures in the Environmental Management Programme (EMPr) and Mitigation Plans (**Annexure H**) should be complied with and monitored during the Pre-Construction, Construction as well as the Operational Phases;
- Section 38 approval in terms of the NHRA approval must be obtained from SAHRA prior to commencement.
- Section 50 approval in terms of NEM:PAA must be obtained from the CHKWHS Management Authority prior to commencement.
- A Stormwater Management Plan in line with the sustainable urban design standards (SUDS) must be approved by Mogale City Local Municipality (MCLM) and implemented during the construction and operational phases of the project
- An Environmental Control Officer (ECO) must be appointed during the construction phase to ensure environmental compliance;
- Conditions attached to the Water Use Licence, to be issued by DHSWS, must be complied with.

13. CONCLUSION

In conclusion, the Draft BAR established the scope of the Proposed Activity and Alternative and identified potential impacts on the receiving biophysical and social environments.

Comments and/or concerns identified by Interested and Affected Parties (I&APs) during the notification period have been incorporated in the Draft BAR. All comments received on the Draft BAR will be incorporated in the Final BAR which will be made available simultaneously to

registered I&AP's and DEFF for consideration. Further comments on the Final BAR will also be addressed and forwarded to DEFF.

The ability to mitigate identified impacts have been investigated in this Draft BAR and is also summarised into a working/ dynamic Environmental Management Programme (EMPr) for consideration by I&APs and the DEFF.

ANNEXURE A – MAPS

Portion 58 Kromdraai 520 JQ

LOCATION MAP

Legend

 Site Boundary



Google Earth

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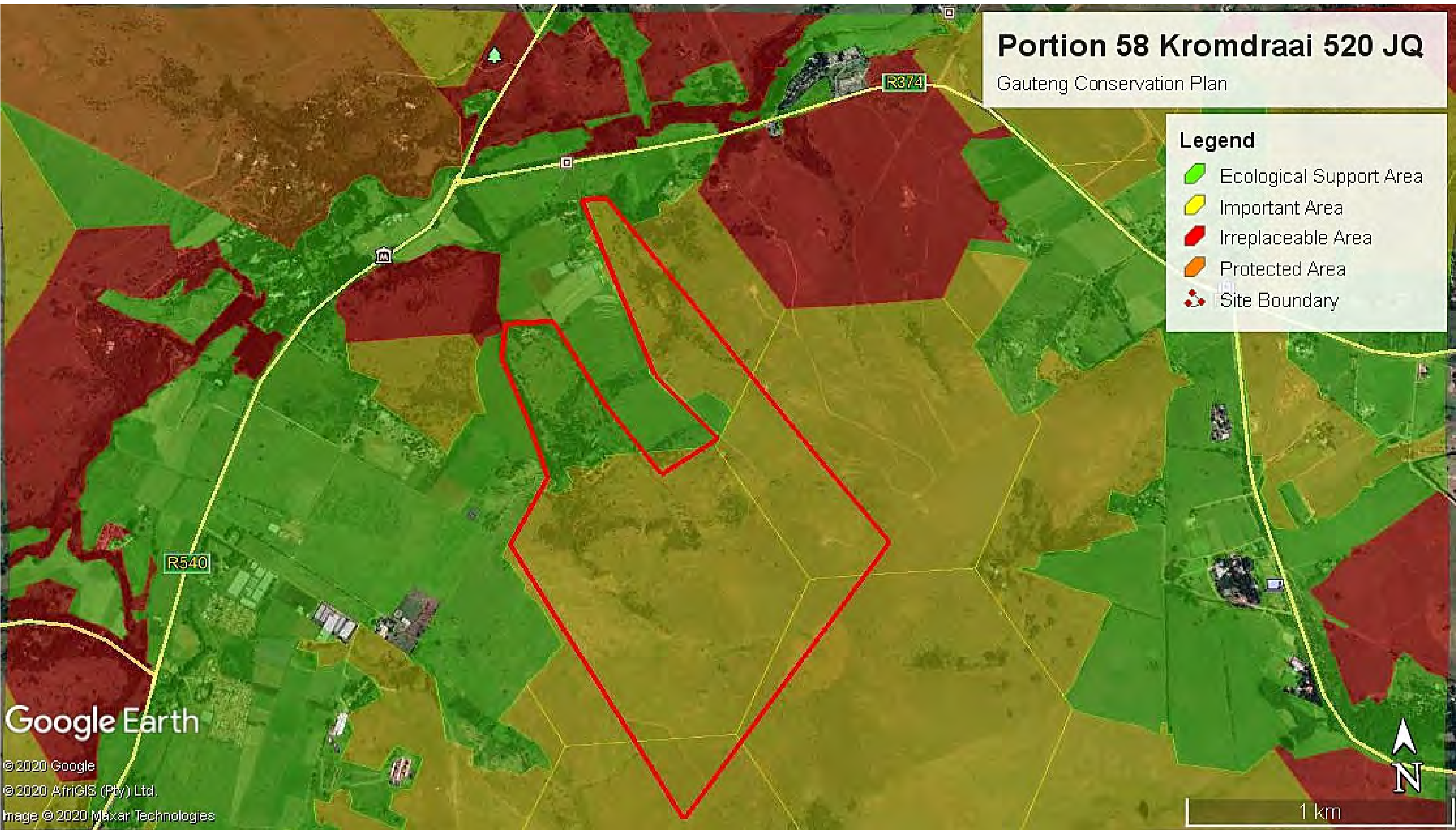
3 km

Portion 58 Kromdraai 520 JQ

Gauteng Conservation Plan

Legend

-  Ecological Support Area
-  Important Area
-  Irreplaceable Area
-  Protected Area
-  Site Boundary



Google Earth




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1 km

Portion 58 Kromdraai 520 JQ

Gauteng Rivers and Wetlands

Legend

-  Rivers
-  Site Boundary
-  Wetland Buffers



Google Earth

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Portion 58 Kromdraai 520 JQ

Gauteng Ridges

Legend

-  Class 1 Ridge
-  Class 2 Ridge
-  Site Boundary

Google Earth

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1 km

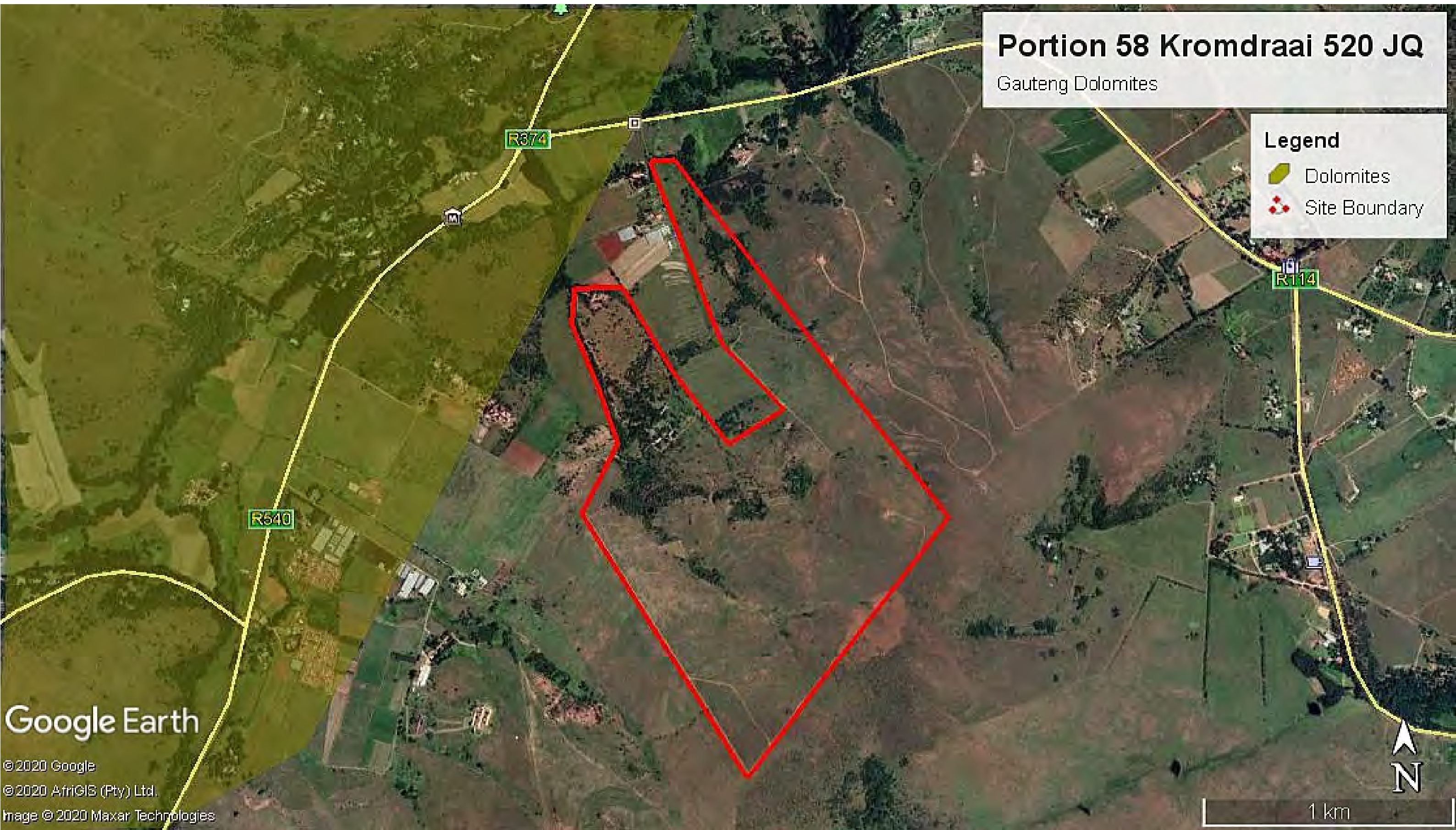


Portion 58 Kromdraai 520 JQ

Gauteng Dolomites

Legend

-  Dolomites
-  Site Boundary







Google Earth

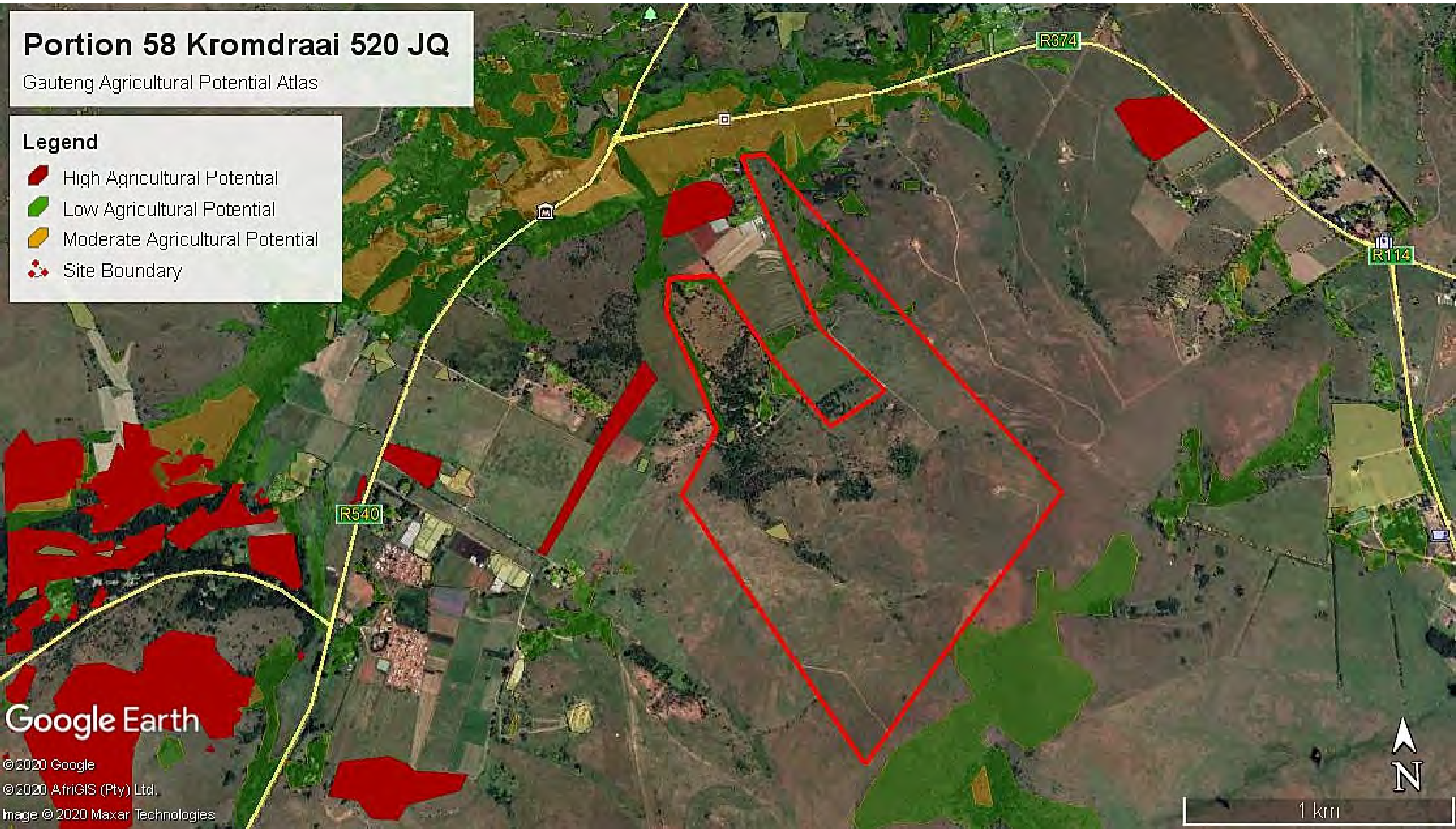
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Portion 58 Kromdraai 520 JQ

Gauteng Agricultural Potential Atlas

Legend

-  High Agricultural Potential
-  Low Agricultural Potential
-  Moderate Agricultural Potential
-  Site Boundary



Google Earth

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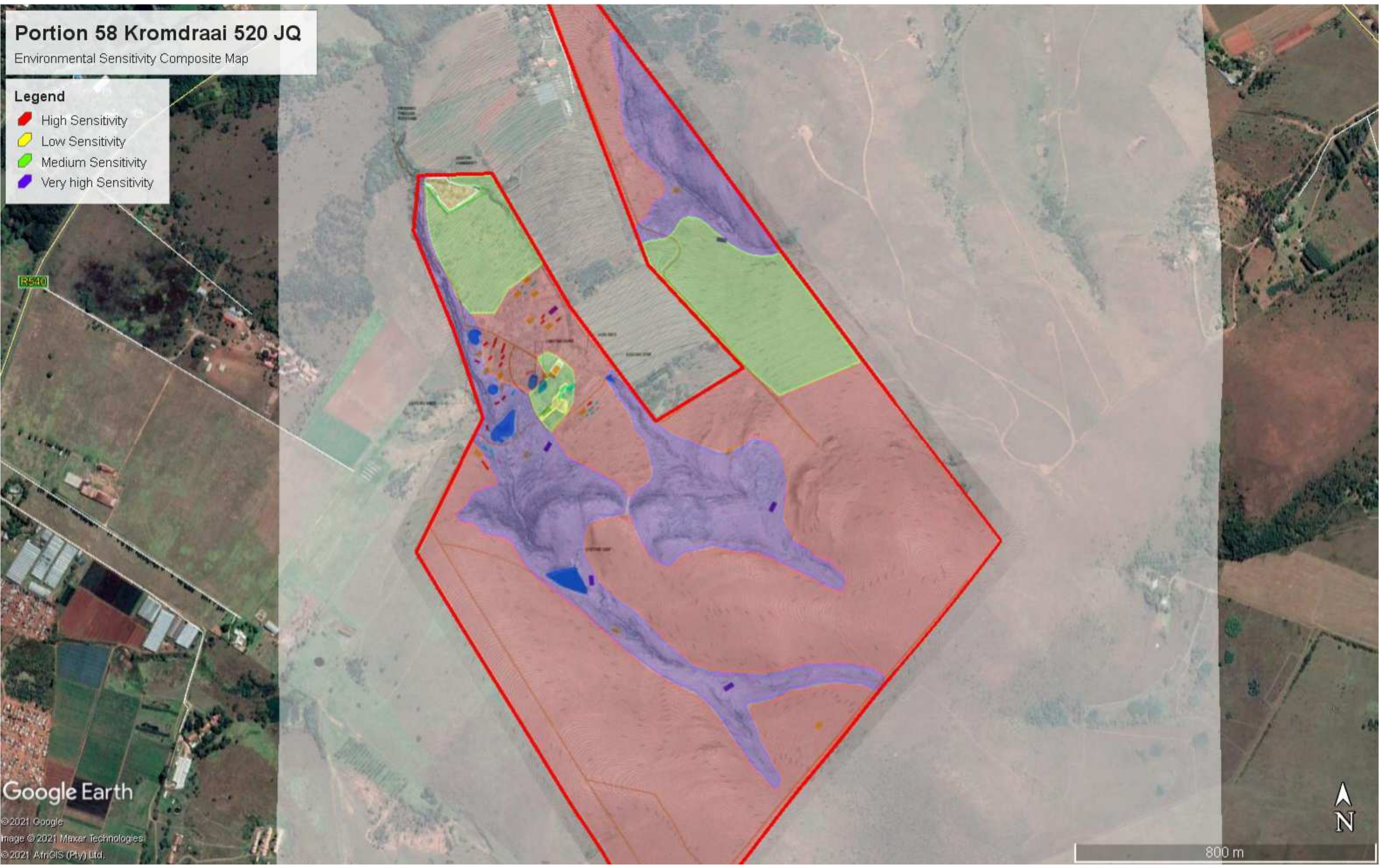
Image © 2020 Maxar Technologies

Portion 58 Kromdraai 520 JQ

Environmental Sensitivity Composite Map

Legend

- High Sensitivity
- Low Sensitivity
- Medium Sensitivity
- Very high Sensitivity



ANNEXURE B – PHOTOS

ANNEXURE B: PHOTOGRAPHS

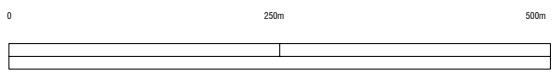
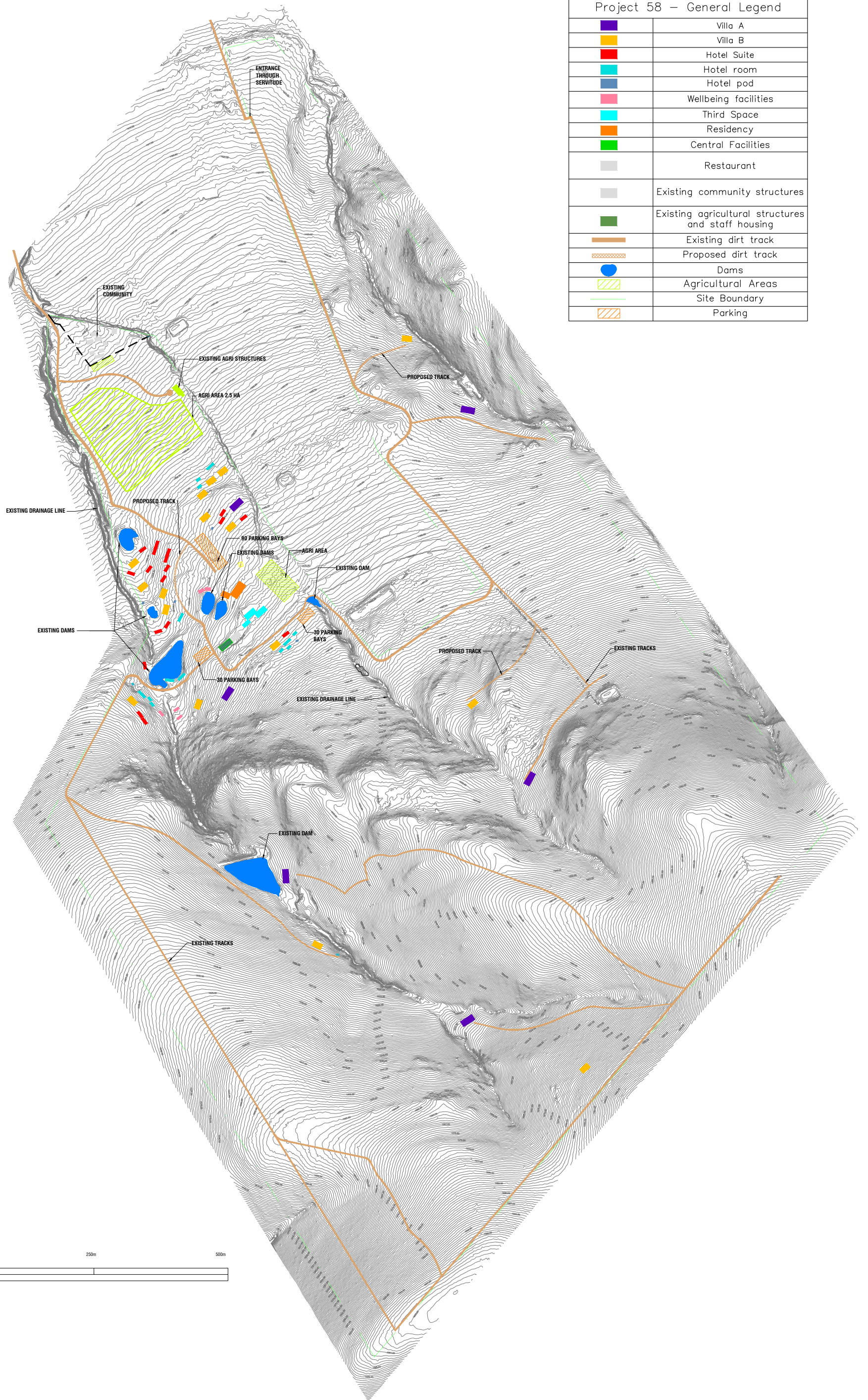






ANNEXURE C – LAYOUT PLAN

Project 58 – General Legend	
	Villa A
	Villa B
	Hotel Suite
	Hotel room
	Hotel pod
	Wellbeing facilities
	Third Space
	Residency
	Central Facilities
	Restaurant
	Existing community structures
	Existing agricultural structures and staff housing
	Existing dirt track
	Proposed dirt track
	Dams
	Agricultural Areas
	Site Boundary
	Parking



ANNEXURE D – ENGINEERING SERVICES

ANNEXURE E – PUBLIC PARTICIPATION

ANNEXURE F – SPECIALIST STUDIES

ANNEXURE G – CV'S AND QUALIFICATIONS



ENVIRONMENTAL
CONSULTANTS
INTERNATIONAL



COMPANY PROFILE

www.ecinternational.net



ECI is a specialist environmental consultancy focusing on innovative and responsive solutions.

WHAT WE DO

At ECI we are moving towards providing our clients with more than just a service that is responsive to the legislative requirements. We believe that we can add value at all levels of business by understanding our client's individual needs and developing relationships that respond to those needs proactively.

The collective experience of our consultants as well as our innovative and solution-driven approach means that we can confidently provide the widest range of services & solutions.



WHO WE ARE

We are a focused solution-based entity with a drive to build a strategic and quality consulting company that will:

- Provide unique and informed sustainable solutions in response to legislative and stakeholder challenges;
- Maintain an entrepreneurial and creative approach to doing business;
- Continue to apply experience gained by its team since 1991 on projects, in SADC, East and West Africa; and
- Value long-term relationships over short-term wins.



We offer our clients **excellent sustainable solutions**, which are premised on sound relationships

SERVICE AREAS

- Strategic Assessment & Planning
- Site selection & Due Diligence
- Landscape Architecture
- Environmental & Social Impact Assessment
- Licensing Applications (EIA & BAs, WULAs & GAs)
- Biodiversity Assessments
- Monitoring & Auditing
- Public Consultation & Stakeholder Engagement
- Peer Reviews
- Environmental Advisory Services



KEY PROJECTS*

- Bokoko Mixed Use Development, Cameroon
- Arco Norte Tourism Masterplan, Mozambique
- Taghazout Resort Development ESIA, Morocco
- Giant Flag Licensing, South Africa
- Rainbow Junction Mall and mixed use EIA, South Africa
- Solar Projects (various), South Africa
- Lanseria Commercial Development Licensing, South Africa
- Huddle Park Residential and Commercial Licensing, South Africa
- Fourways Mall upgrade licensing; South Africa
- Biofuel Plant and Supply Production ESIA, Mozambique
- Biomass Power Plant and Forestry Development ESIA, Ghana
- Numerous lodge and rural lifestyle residential development EIA's
- Silverstar Casino, South Africa EIA

**Some of the numerous projects undertaken by members of the ECI team for other companies, to illustrate level of experience. A more extensive list is available.*



Valuing **long-term relationships** over short term wins.

CONTACT US

Gauteng Office

Mooikloof Office Park West
Building 8, Ground Floor
Atterbury Road Extension
c/o Jollify Main Road
Mooikloof
Pretoria
0081

Tel | + 27 (0)12 942 9666

KwaZulu-Natal Office

52 Dan Pienaar Road
Glenmore
Durban
4001

Tel | + 27 (0)71 675 9810

Fax | +27 (0)86 214 1208
Email | info@ecinternational.co.za
Web | www.ecinternational.net

From: June 2015 Employer: Position held:	To: Aug 2016 GIBB Engineering (Pty) Ltd Environmental Manager
From: March 2012 Employer: Position held:	To: June 2015 Strategic Environmental Focus (Pty) Ltd Environmental Manager
From: August 2010 Employer: Position held:	To: March 2012 Cave Klapwijk Associates (Pty) Ltd Landscape Architect / Environmental Consultant
From: April 2010 Employer: Position held:	To: August 2010 Jacana Environmentals cc. Environmental Consultant
From: Jan 2005 Employer: Position held:	To: Dec 2008 Groundwork Caerphilly Landscape Architect
From: April 2004 Employer: Position held:	To: Dec 2005 James Blake Associates Landscape Architect

TYPICAL TASKS UNDERTAKEN:

YEAR:
LOCATION:
CLIENT:
MAIN PROJECT ASPECT:
POSITIONS HELD:
ACTIVITIES PERFORMED:

AUDITING, LICENCING AND AUTHORISAITONS

From: 2010 To: Current
Gauteng, North West Province, Mpumalanga, Limpopo
Various Clients
Environmental Licensing for roads, housing estates, mines, energy projects, industrial processes and general land use developments.
Environmental Manager

- Dinokeng Section 24G Group Application (November 2019)
- Portion 78 and 81 Klipdrift 90 Basic Assessments (November 2019)
- Tshwane Fresh Produce Market Environmental Status Quo Report (April 2019)
- Egoli Gas Appeal (March 2019)
- Elandsfontein Abattoir Scoping, EIA and Waste Management License (January 2019)
- K14 Apies river crossing EA Amendment Application (August 2018)
- Rietvlei Lifestyle Estate: Scoping and Environmental Impact Assessment (ongoing)
- Delmore Park Ext 8 Residential Development Mine Closure Application (ongoing)
- Rainbow Junction pipeline crossing Environmental Compliance Audits (April 2018 - ongoing)
- Fourways Crossings and Attenuation Dam Environmental Compliance Audits (July 2017 - ongoing)

- Olivedale Amsterdam Environmental Compliance Audits (July 2017 - ongoing)
- Walkersons Intergrated Water Use License Application (July 2017 – ongoing)
- Huddle Park Environmental Compliance Audits (July 2017 - ongoing)
- Perth Solar PV Facilities: Scoping and Environmental Impact Assessment (January 2016)
- Hazledean Boulevard Class 3 Road: Scoping and Environmental Impact Assessment (January 2015)
- Hartenbos Heuwels Township Development: Scoping and Environmental Impact Assessment Process (January 2015)
- Letaba Ranch Basic Assessment and Water Use License (April 2015)
- Finetown Proper and Ennerdale South Township Development: Basic Assessment (March 2014)
- Dullstroom Municipal Dam Water Treatment Works: Basic Assessment and Water Use License (October 2013)
- Vlakfontein East Block Open Cast Coal Mine: Scoping and Environmental Impact Assessment (April 2013)
- Glencore Paardekop and Amersfoort Underground Coal mines: Scoping and Environmental Impact Assessment (September 2012)
- N3 (National Highway Project): Keeversfontein to Warden (De Beers Pass Section) Scoping and Environmental Impact Assessment (2011)

VISUAL IMPACT ASSESSMENT

YEAR:	From: 2010	To: Current
LOCATION:	Gauteng, Mpumalanga, Eastern Cape	
CLIENT:	Various Clients	
MAIN PROJECT ASPECT:	Undertaking Visual Impact Assessments for land development in pristine areas	
POSITIONS HELD:	<i>Visual Specialist</i>	
ACTIVITIES PERFORMED:	<ul style="list-style-type: none">- God's Window Skywalk Visual Impact Assessment (January 2015)- Aquarella Mining Right Application Visual Impact Assessment (November 2014)- Mareetsane Batho-Batho Solar PV Facility Visual Impact Assessment (June 2013)- Huddle Park Development Visual Impact Assessment (August 2012)- Xstrata Paardekop and Amersfoort Visual Impact Assessment (September 2012)- The Giant Flag Project Visual Impact Assessment (October 2012)	

REHABILITATION AND MANAGEMENT PLANS

YEAR:	From: 2010	To: Current
LOCATION:	Gauteng	
CLIENT:	Various Clients	
MAIN PROJECT ASPECT:	Compiled various rehabilitation	
POSITIONS HELD:	<i>Environmental Manager</i>	
ACTIVITIES PERFORMED:	<ul style="list-style-type: none">- Leopard Cave Safaris Management Plan, 2016- Hazledean Rehabilitation Plan, 2016- Hazledean Construction Management Plan, September 2012- West End Rehabilitation and Monitoring Plan, October 2012- Westlake View Integrated Management Plan, July 2012- Highlands Wetland Rehabilitation Plan, July 2012	

PUBLIC PARTICIPATION

YEAR: From: 2010 To: Current
LOCATION: South Africa
CLIENT: Various
MAIN PROJECT ASPECT: Facilitate statutory Public Participation processes for various Environmental Authorisation applications.
POSITIONS HELD: **Environmental Manager**
ACTIVITIES PERFORMED: - Facilitation of Public Participation processes including, notification, advertisements, public meetings, stakeholder engagement and the compilation of statutory documentation for submission.

LANDSCAPE DESIGN

YEAR: From: 2004 To: 2012
LOCATION: United Kingdom and South Africa
CLIENT: Various
MAIN PROJECT ASPECT: Landscape design and project management for various landscape design projects from inception to practical completion.
POSITIONS HELD: **Landscape Architect**
ACTIVITIES PERFORMED: - Johannesburg City Parks – Occupational Health and Safety compliance project (March 2013);
- Maunde Street Traffic Circle, June 2012;
- Oudtshoorn Township Regeneration Project, February 2011;
- Goudrand Park Play Area, September 2011;
- Orange Farm Entrance Sketch Plan, November 2011;
- The development, design, implementation and management of a series of community-led landscape projects in South Wales (UK) between 2005 and 2008, including:

- o Abertysswg Mining Memorial;
- o Crosskeys Canal Access Scheme;
- o Commin Road Regeneration Project;
- o Markham Resource centre Sensory Garden;
- o Mountain View Estate Regeneration Project; and
- o Wattsville Community Garden

Certification

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications and my experience.



Date: 3 December 2019



We certify that

Hanlie Grobbelaar

having complied with the requirements of the Higher Education Act


and the Institutional Statute, was admitted to the degree of

HONOURS BACHELOR OF SCIENCE
in Environmental Monitoring and Modelling

at a congregation of the University

on 10 June 2010

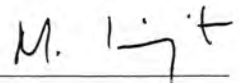
GESERTIFISEER 'N WARE AFSCRIF
VAN DIE OORSPRONKLIEKE
CERTIFIED A TRUE COPY OF THE ORIGINAL


28/07/17
NICO CRAILL - POSTNET ATTERBURY
COMMISSIONER OF OATHS
OATHS NUMBER: 9/1/9/2 PRETORIA



Vice-Chancellor





Executive Dean



University Registrar





University of Pretoria

The Council and Senate hereby declare that
at a congregation of the University the degree

Baccalaureus Scientiae (Landscape Architecture)

with all the associated rights and privileges
was conferred on

HANLIE GROBBELAAR

in terms of the Higher Education Act, 1997 and the Statute of the University

On behalf of the Council and Senate

Vice-Chancellor and Principal

On behalf of the Faculty of Engineering,
Built Environment and Information Technology

Dean

GESERTIFISEER 'N WARE AFSKRIF
VAN DIE OORSPRONKLIKE
CERTIFIED A TRUE COPY OF THE ORIGINAL

NICO CRAILL - POSTNET ATTORNEY
COMMISSIONER OF OATHS
OATHS NUMBER: 9/1/8/3 PRETORIA

Registrar



2004-04-21



IAIASa Secretariat
Tel +27(0)11 655 7183
Fax 086 662 9849

Address:
43 Birchwood Court, Montrose
Street, Vorna Valley, Midrand,
1618

Postal address:
PO Box 11666, Vorna Valley,
1686
Email: operations@iaiasa.co.za
Website: www.iaiasa.co.za

IAIASa Confirmation of Membership: 2021/2022
Hanlie Van Greunen Membership Number: 6657

24 Feb 2021

TO WHOM IT MAY CONCERN

Mrs Hanlie Van Greunen, Environmental Consultants International (Pty) Ltd (IAIASa membership Number **6657**) is a paid-up Full Member in good standing of International Association for Impact Assessment, South Africa and has been a member of IAIAsa since 01 Mar 2021.

Membership has been continuous from 01 Mar 2021 to date.

This membership is valid from 01 Mar 2021 to 28 Feb 2022.

IAIASa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisation's code of ethics which is available on our website.

IAIASa is an Affiliate of IAIA which is an international body through a memorandum of understanding. IAIA is not responsible or liable for the actions or activities of the Affiliates. Membership of one does not imply membership of the other.

Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Abulele Adams
President 2020/2021

President: A. Adams, Past President: S. Nkosi, President Elect: R. Mbokodi, Treasurer: T. Bokwe, Secretary: M. Sham. Members: F. Fortune, D. Neumann, P. Sithole. Branch Chairs: M. Groenink, S. Nkomonde, R. Mbokodi, P. Radford, C. Roos.

POSITION	:	DIRECTOR
NAME OF FIRM	:	ENVIRONMENTAL CONSULTANTS INTERNATIONAL (PTY) LTD
NAME OF STAFF	:	David (Dave) Barry RUDOLPH
DATE OF BIRTH	:	10.12.1968
NATIONALITY	:	South African

SUMMARY OF QUALIFICATIONS:

Dave Rudolph has 28 years of experience in the field of environmental management and resource planning. The experience relates to large scale spatial planning and assessment initiatives at a National, Provincial and Local level. He has managed numerous large scale Environmental Planning, Environmental Assessments, both nationally and internationally.

His key experience includes:

- Project management and advisor on various scale applications and projects both locally (South Africa) and abroad
- Management, co-ordination and review of specialist studies and environmental applications
- Client representation on interest forums
- Development of terms of reference and project proposals
- Co-ordination and management of numerous Scoping reports and Environmental Impact Assessments in terms of the National Environment Management Act
- Development of Spatial Planning projects and Strategic Assessments
- Management of Environmental Management Programme Reports in terms of the Mining Petroleum Resource Development Act
- Specialist reviewer for numerous environmental processes
- Advise clients on environmental feasibility of projects
- Specialist witness on environmental aspects
- Environmental Due Diligence

EDUCATION:

<i>Institution:</i>	<i>Qualification:</i>	<i>Year Obtained:</i>
University of Pretoria	Bachelor of Landscape Architecture (BL)	1991

MEMBERSHIPS OF PROFESSIONAL ASSOCIATIONS:

- Registered as a Professional Landscape Architect (Reg. No. 20148) with the South African Council for the Landscape Architectural Profession (SACLAP)
- Member of International Association of Impact Assessors (IAIA Reg. No. 6239)

COUNTRIES OF WORK EXPERIENCE:

Botswana	Democratic Republic of Congo	Ghana
Kenya	Zambia	Swaziland
Morocco	Mozambique	Antarctica
Cameroon	South Africa	
Ethiopia	(All Provinces)	

LANGUAGES:

	<i>Speaking:</i>	<i>Reading:</i>	<i>Writing:</i>
English (1 st Language)	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

From: 2016	To: Date
Employer:	Environmental Consultants International (Pty) Ltd
Position held:	Founder and Director
From: 2015	To: 2016
Employer:	GIBB Engineering (Pty) Ltd
Position held:	Business Development Executive
From: 1997	To: 2015
Employer:	Strategic Environmental Focus (Pty) Ltd
Position held:	Founder and Chief Executive Officer
From: 1992	To: 1997
Employer:	Department of Environmental Affairs and Tourism
Position held:	Senior Landscape Architect
From: 1990	To: 1992
Employer:	Van Riet and Louw Landscape Architects
Position held:	Landscape Architect

TYPICAL TASKS UNDERTAKEN:

- Sustainable Spatial Planning and landscape architect projects
- Environmental Policy Development
- Environmental Impact Assessments and Environmental and Social Impact Assessments (ESIAs)
- Basic Assessments (BA's)
- Water Use License Applications AND General Authorizations (WULAs and GA's)
- Waste Management Plans
- Air Quality Management Plans
- Specialists Review
- Environmental Legislation
- Environmental Due Diligence
- Environmental management system for Antarctica

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS (INTERNATIONAL)

YEAR:	From: 1997 To: Current
LOCATION:	Botswana, Kenya, Ghana, Morocco Mozambique Swaziland, Lesotho and Cameroon
CLIENT:	Various Clients
MAIN PROJECT ASPECT:	ESIA for forestry, power plants, powerlines, industrial processes general land-use developments
POSITIONS HELD:	Project Director
ACTIVITIES PERFORMED:	<ul style="list-style-type: none"> - Large scale forestry project in Ghana Development - Land-use development plan for the Pemba Mozambique - Industrial process for a liquor plant in Kenya - Power supply network for Swaziland - Large scale residential and golf estate development in Agadir, Morocco - Large scale residential and golf course estate in Mozambique - Lodge development in Tuli Block Botswana - Large scale Resort, Commercial and residential development in Cameroon

**A more comprehensive list is available should it be required*

SUSTAINABLE SPATIAL PLANNING AND POLICY DEVELOPMENT

YEAR: From: 1997 To: Current
 LOCATION: Gauteng, North West Province, Mpumalanga, South Africa, Swaziland, Cameroon, Mozambique
 CLIENT: Various Clients
 MAIN PROJECT ASPECT: Extensive experience in the development of tools for sustainable planning and development, using a platform of preferred spatial technologies.
 POSITIONS HELD: **Project Director**
 ACTIVITIES PERFORMED:

- Development of a Coordinated and Integrated Permitting System (C&IPS) for the National Department of Environmental Affairs.
- Gauteng Open Space Project Phase 3 (GOSP 3) - Gauteng Department of Agriculture, Conservation, Environment and Land Affairs, 2003.
- Johannesburg International Airport Industrial Development Zone Environmental Management Framework - Blue IQ, 2002.
- City Deep Terminal Industrial Development Zone Initial Environmental Management Framework - Blue IQ, 2002.
- The Draft Provincial Policy for the Klipriviersberg - Gauteng Department of Agriculture, Conservation, Environment and Land Affairs, 2001.
- Gauteng Open Space Project Phase 2 (GOSP 2) - Gauteng Department of Agriculture, Conservation, Environment and Land Affairs, 2000.
- 2003 North West Province Biodiversity Atlas 2003
- Johannesburg Metropolitan Open Space System (JMOSS Phase I and II) - City of Johannesburg, 2002, 2004.
- Tshwane Open Space Plan (TMOSS Phase I, II & III) - City of Tshwane, 2005
- Mpumalanga State of Environment Report – Mpumalanga Province, Current
- Arco Norte Tourism Master Plan for the environmental and landscape architectural aspects - USAID and Mozambique Tourism
- Strategic Conservation Planning for the Modderfontein Nature Reserve, Modderfontein, Gauteng - Heartland Properties (Pty) Ltd.
- Strategic Environmental Assessment for the Eskom Electrical Master Plan – Thohoyandou Service Area – Iyanda Power Technologies.
- Strategic Environmental Assessment for the Eskom Electrical Master Plan Cape Peninsula Service Area – NETGroup (Pty) Ltd.
- Capacity Building and Mentoring to Eskom Holdings Limited – Transmission for a Strategic Environmental Assessment for transmission corridors in the north-eastern area of South Africa – Eskom Holdings Limited.
- Strategic Environmental Assessment for the Eskom Electrical Master Plan – Western West Coast Service Area – NETGroup (Pty) Ltd.
- Strategic Environmental Assessment for the Eskom Electrical Master Plan – East Rand North Service Area – NETGroup (Pty) Ltd.
- Integrated Environmental Implementation Plan for the Bushbuckridge Local Municipality, Mpumalanga – Bushbuckridge Local Municipality.
- Project Director for The Eskom-Kudu 400kV Integration Project.

**A more comprehensive list is available should it be required*

ENVIRONMENTAL IMPACT ASSESSMENTS AND ENVIRONMENTAL MANAGEMENT PLANS

YEAR: From: 1997 To: Current
 LOCATION: South Africa
 CLIENT: Various Clients
 MAIN PROJECT ASPECT: Completed EIA and EMP's
 POSITIONS HELD: **Project Director**
 ACTIVITIES PERFORMED:

- Various EIA applications for proposed PV Solar Plants within the Northern Cape, Free State and Mpumalanga Provinces – Avelar Energy SA.



- EIA for the proposed West Lake View Township Development, Modderfontein, Gauteng – Heartland Properties (Pty) Ltd.
- EIA for the proposed Marlboro Road (M60) Extension, Modderfontein, Gauteng – Heartland Properties (Pty) Ltd.
- EIA and BA's for numerous (excess of 40) filling stations
- EIA for the proposed Highlands Extension 5 Project, Modderfontein, Gauteng – Heartland Properties (Pty) Ltd.
- EIA for the proposed Amakhosi Energy Generation Project, Mbazwana, KwaZulu-Natal – Thuthuka Group Limited.
- EIA for a proposed large residential development in Brenton-on-Sea, near Knysna – Zamien Investments (Pty) Ltd.
- Project Director for 2nd Phase EIA for the proposed MeerKAT (Karoo Array Telescope), near Carnarvon, Northern Cape – Northern Cape Department of Education in association with the Square Kilometer Array project.
- EIA for the proposed Karoo Array Telescope (KAT), near Carnarvon, Northern Cape - Northern Cape Department of Education in association with the Square Kilometer Array project.
- Various Basic Assessment (BA) applications for proposed PV Solar Plants within the Northern Cape, Free State and Mpumalanga Provinces – Avelar Energy SA.
- BA for the proposed new 132 kV powerline in Kimberley – Eskom Holdings Limited.
- Undertaken a variety of EMPr's which include Clay quarries, Diamonds, Gold, Platinum group metals, Coal operations. Clients include:
 - o Anglo Platinum
 - o BHP Billiton
 - o Impala Platinum
 - o Lonmin Platinum
 - o Glencore Xstrata
 - o Exxaro
 - o Ceramics Industries

**A more comprehensive list is available should it be required*

WATER USE LICENSE APPLICATIONS

YEAR:
 LOCATION:
 CLIENT:
 MAIN PROJECT ASPECT:
 POSITIONS HELD:
 ACTIVITIES PERFORMED:

From: 2000 To: Current

South Africa

Various Clients

WULAs

Project Director

- Integrated Waste and Water Management Plan (IWWMP) for a Water Use License Application for the MeerKAT (Karoo Array Telescope) Project in the Northern Cape – Northern Cape Department of Education.
- WULA for the Upgrading of Atterbury Road, Menlyn, Pretoria, Gauteng - Eris Property Group.
- WULA for the West Lake View Township Development, Modderfontein, Gauteng – Heartland Properties (Pty) Ltd.
- WULA for the proposed Marlboro Road (M60) Extension, Modderfontein, Gauteng – Heartland Properties (Pty) Ltd.
- WULA for the proposed Highlands Extension 5 Project, Modderfontein, Gauteng – Heartland Properties (Pty) Ltd

**A more comprehensive list is available should it be required.*

WASTE MANAGEMENT PLANS

YEAR: From: 2012 To: Current
 LOCATION: South Africa
 CLIENT: West Rand District Municipality
 MAIN PROJECT ASPECT: An Integrated Waste Management Plan (IWMP)
 POSITIONS HELD: **Project Director**
 ACTIVITIES PERFORMED: - Developed an Integrated Waste Management Plan (IWMP) for the West Rand District Municipality, Gauteng – West Rand District Municipality

AIR QUALITY MANAGEMENT PLAN

YEAR: From: 2003 To: Current
 LOCATION: Gauteng, South Africa
 CLIENT: West Rand District Municipality
 MAIN PROJECT ASPECT: Air Quality Management Plan (AQMP)
 POSITIONS HELD: **Project Director**
 ACTIVITIES PERFORMED: - Air Quality Management Plan (AQMP) for the West Rand District Municipality, Gauteng –West Rand District Municipality.

SPECIALIST REVIEWS

YEAR: From: 1995 To: Current
 LOCATION: South Africa
 CLIENT: Various Clients
 MAIN PROJECT ASPECT: Specialist and independent review of impact management reports for all sectors of government organizations, civil society and the legal fraternity
 POSITIONS HELD: **Project Director**
 ACTIVITIES PERFORMED: An abbreviated list of projects of this nature includes:
 - Project Director: Review of a Construction Environmental Management Plan, Sustainable Utilisation plan and Rehabilitation Strategy for the propose Bergwater dam in the Cape - TCTA, 2003.
 - Advisor: Review of a scoping report for the proposed Rhino Casino in Mogale City Local Municipality- Mogale City Local Municipality, 2003.
 - Part of the review panel for the Richards Bay Minerals mining application for the eastern shores of St Lucia.
 - Reviewed and evaluated approximately 700, Environmental Management Programme (EMP) reports and environmental impact assessments.
 - Participated in numerous Development Facilitation Act (DFA) tribunals on behalf of applicants and various other organisations.
 - Participated in the legal team for the Due diligence on behalf of Corruveal for the Sappi Enstra acquisition as the Environmental Expert
**A more comprehensive list is available should it be required*

ENVIRONMENTAL LEGISLATION

YEAR: From: 1997 To: Current
 LOCATION: South Africa
 CLIENT: Various Clients
 MAIN PROJECT ASPECT: Facilitation of information and training seminars and public workshops. Development of EIA regulation in terms of the Environment Conservation Act, Act 73 of 1989.and National Environmental Management Act
 POSITIONS HELD: **Project Manager/Director**
 ACTIVITIES PERFORMED: - Facilitated and presented at National and Provincial information seminars on behalf of the National Department of Environmental Affairs and Tourism (DEAT) regarding the new EIA Regulations (May & June 2006):

- Country wide series of 11 one-day seminars to officials, the environmental sector and other interested parties.
- Facilitated a two-day Provincial information and training session for each of the nine regions in the Western Cape on behalf of the Department of Environmental Affairs and Development Planning (DEADP).
- Facilitated a two-day NEMA training session for the Cape Town City Council on behalf of the City of Cape Town.
- Facilitated the public workshops for the noise regulations on behalf of the Gauteng Department of Agriculture Conservation and Environment, 1999.
- During my employment at the Department of Environment Affairs and Tourism Assisted in developing the environmental impact assessment regulation in terms of the Environment Conservation Act, Act 73 of 1989.

Certification

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications and my experience.



Date: 15 January 2020

**ANNEXURE H – ENVIRONMENTAL MANAGEMENT
PROGRAMME**



ENVIRONMENTAL
CONSULTANTS
INTERNATIONAL

THE PROPOSED PROJECT FIFTY-EIGHT
DEVELOPMENT ON PORTION 58 OF THE FARM
KROMDRAAI 520 JQ
DEFF REF NO.2020-10-0029

DRAFT ENVIRONMENTAL MANAGEMENT
PROGRAMME
APRIL 2021



THE PROPOSED PROJECT FIFTY-EIGHT DEVELOPMENT ON PORTION 58 OF THE FARM KROMDRAAI 520 JQ ENVIRONMENTAL MANAGEMENT PROGRAMME

Prepared for:

Anderbridge Investments (Pty) Ltd

Contact Person: Mr. Glen Scorgie

e-mail: Glen@Caleocapital.com

Submitted to:



Department of Environment Forestry and Fisheries

Environment House

473, Steve Biko Rd & Soutpansberg Rd

Arcadia

0083

Compiled by:



Environmental Consultants International (Pty) Ltd

Mooikloof Office Park West

Building 8, Ground Floor

Atterbury Road, Extension

Pretoria

Contact: Hanlie Van Greunen

Tel No.: (012) 942 9666

Email: hanlie@ecinternational.co.za

Date: April 2021

ECI Project Code: A81149

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Table of Contents

1. GENERAL INTRODUCTION	1
1.1 Purpose of the EMPr.....	1
1.2 Objectives of the EMPr	1
2. DETAILS OF THE EAP	3
2.1 Environmental Consultants International (Pty) Ltd	3
2.2 Expertise and Experience of the EAP	3
3. PROJECT DESCRIPTION	4
3.1 General Project Description	4
3.2 Specific Activities Covered by the EMPr	4
3.3 Identified Impacts	5
4. ADMINISTRATIVE STRUCTURE AND RESPONSIBILITIES	9
4.1 Roles and Responsibilities	9
5. TRAINING AND ENVIRONMENTAL AWARENESS	12
6. DETAILED ENVIRONMENTAL MANAGEMENT PLAN	13
6.1 Pre- Construction / Planning Phase	13
6.2 Construction Phase.....	15
6.3 Operational Phase	33
6.4 Closure and/or Decommissioning Phase	41

Glossary

Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. In this report, the terms 'activity' and 'development' are freely interchanged.
Alien Species	A species that is not an indigenous species; or an indigenous species translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.
Alternatives	Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.
Applicant	The project proponent or Developers responsible for submitting applications (Environmental Authorisation, Waste Management Licence, Water Use Licence etc.) to the relevant environmental authority
Biodiversity	The diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.
Buffer	A buffer is an area that protects adjacent communities from unfavourable conditions. A buffer zone is usually an artificially imposed zone included in a management plan.
Building & Demolition Waste	Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition which include (a) discarded concrete, bricks, tiles and ceramics; (b) discarded wood, glass and plastic; (c) discarded metals; (d) discarded soil, stones and dredging spoil; (e) other discarded building and demolition waste.
Construction	The building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

Contractor	Companies appointed on behalf of the Client to undertake activities, as well as their sub-contractors and suppliers.
Cumulative Impact	The impact of an activity that may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decommissioning	The demolition of a building, facility, structure or infrastructure.
Degradation	The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation.
Demolition	The tearing-down of buildings and other structures, the opposite of construction.
Direct Impact	Impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.
Domestic Waste	Waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes, which include (a) garden and park waste; (b) municipal waste and (c) food waste.
Emergency	An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.
Environment	The surroundings within which humans exist and that are made up of: i. the land, water and atmosphere of the earth; ii. micro-organisms, plants and animal life; iii. any part or combination of (i) or (ii) and the interrelationships among and between them; and iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Control Officer	An individual nominated through the Developer to be present on site to act on behalf of the Developer in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities.
Environmental Impact	A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.
Environmental Assessment	The generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes

	methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.
Environmental Authorisation	An authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.
Environmental Assessment Practitioner (EAP)	The individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.
Environmental Impact Assessment (EIA)	In relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application as defined in NEMA.
Environmental Management	Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation phase and decommissioning phase of the proposed project. Fatal Flaw An event or condition that could cause an unanticipated problem and/or conflict which will could result in a development being rejected or stopped.
General Waste	General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes – i. domestic waste; ii. building and demolition waste; iii. business waste; and iv. inert waste.
General Waste Landfill Site	A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste. Hazardous Waste Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
Hazardous Waste Landfill Site	A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.
Human Waste	Excrement, faeces or other waste material discharged from the human body. Impact A description of the potential effect or

	consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Incident	An undesired event which may result in a significant environmental impact but can be managed through internal response.
Indirect Impacts	Indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
Integrated Environmental Management	A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).
Interested and Affected Party (I&AP)	Any person, group of persons or organisation interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.
Invasive Species	Any species whose establishment and spread outside of its natural distribution range.
Method Statement	A method statement is a written submission by the Contractor to the Engineer in response to the specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting a Method Statement. It contains sufficient detail to enable the Engineer to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.
Mitigate	The implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

Pollution	Any change in the environment caused by – substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Rehabilitation	Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before disruption. Rehabilitation for the purposes of this Environmental Management Programme is aimed at post-reinstatement re-vegetation of disturbed areas and the stability of the land surface. In attempt to achieve this purpose, disturbed areas should be rehabilitated with the establishment of suitable indigenous vegetation. Revegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.
Sensitive Environments	Any environment identified as being sensitive to the impacts of the development.
Topsoil	The A-horizon of the soil profile. Topsoil is the upper layer of soil from which plants obtain their nutrients for growth. It is often darker in colour, due to the organic (humus) fraction. Where topsoil is referred to, it is deemed to be the soil and grass / ground cover fraction. For the purposes of this management programme, where: topsoil is deemed as the layer of soil from the surface (approximately 300 mm) to the specified depth required for excavation.
Waste	Any substance, whether or not that substance can be reduced, re-used, recycled and recovered - i. that is surplus, unwanted, rejected, discarded, abandoned or disposed of; ii. which the generator has no further use of for the purposes of production; iii. that must be treated or disposed of; or iv. that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but— v. a by-product is not considered waste; and vi. vi. any portion of waste, once re-used, recycled and recovered, ceases to ix be waste.
Waste Disposal Facility	Any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.

Watercourse	Defined as: i. a river or spring; ii. a natural channel or depression in which water flows regularly or intermittently; iii. a wetland, lake or dam into which, or from which, water flows; and iv. any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (No 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.
Water Pollution	Direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it – less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (aa) to the welfare, health or safety of human beings; (bb) to any aquatic or non-aquatic organisms; (cc) to the resource quality; or (dd) to property”. Wetland Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.
Workforce	The entire project team including people employed by the Developers or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contactors and casual labour.

ACRONYMS

AoI	Area of Influence
BAR	Basic Assessment Report
CoHWHWS	Cradle of Humankind World Heritage Site
DEFF	Department of Environmental Forestry and Fisheries
DEAT	Department of Environmental Affairs and Tourism
DHSWS	Department of Human Settlements Water and Sanitation
EAP	Environmental Assessment Practitioner
ECI	Environmental Consultants International (Pty) Ltd
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GNR	Government Notice Regulation
ha	Hectares
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
MCLM	Mogale City Local Municipality
NEMA	National Environmental Management Act (Act No. 107 Of 1998)
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM: WA	National Environmental Management: Waste Act
NHRA	The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	The National Water Act 1998 (Act No 36 of 1998)
Sqm	Square Metres
WULA	Water Use License Application

1. GENERAL INTRODUCTION

The Environmental Management Programme (EMPr) aims to ensure 'good environmental practice' by taking a holistic approach to the management of environmental impacts during the construction and operation of the project.

1.1 Purpose of the EMPr

In terms of The Constitution of the Republic of South Africa (1996), everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (Section 24). The needs of the environment as well as affected parties should therefore be integrated into all levels of every project that has the potential to harm people and the environment.

The requirements of the Constitution inform and are supported by the Specific Environmental Management Acts (SEMAs), including:

- National Environmental Management Act (No 107 of 1998 - NEMA),
- National Environmental Management: Waste Act (No 59 of 2008 - NEM:WA),
- National Environmental Management: Air Quality Act (No 39 of 2004 - NEM:AQA),
- National Environmental Management Biodiversity Act (No 10 of 2004 - NEM:BA),
- National Environmental Management Protected Areas Act (No 57 of 2003 - NEM:PAA), and
- National Water Act (No 36 of 1998 - NWA)

This EMPr is developed in terms of the NEMA's and ensures that construction activities meet the requirements of existing environmental legislation and good environmental practice in terms of international norms and standards. This is achieved by identifying those activities for the proposed development that may have a negative impact on the environment; outlining the mitigation measures that will need to be taken and the steps necessary for their implementation and describing the reporting system to be undertaken during construction.

1.2 Objectives of the EMPr

The EMPr has the following objectives:

- To ensure compliance with regulatory authority stipulations and guidelines; which may be local, provincial, national, and/or, international;
- To outline functions and responsibilities of responsible persons;
- To state standards and guidelines, which are required to be achieved in terms of environmental legislation;

- To outline mitigation measures and environmental specifications, which are required to be implemented for all phases of the project to minimise the extent of environmental impacts, and to manage environmental impacts;
- To prevent long-term or permanent environmental degradation;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Ensure that all workers, subcontractors and other involved in the project meet legal and other requirements regarding environmental management;
- Incorporate environmental management into project design and operating procedures; and
- Address concerns and issues addressed in the EIA's stakeholder consultation process and those that will likely to continue to arise during the project's lifetime.

An independent **Environmental Control Officer (ECO)** must be appointed (by the proponent) to ensure compliance with the EMPr. The EMPr will be considered an extension of the Conditions of Approval as set forth by the Gauteng Department of Agriculture and Rural Development. Non-compliance with the EMPr will constitute non-compliance with the said Conditions.

2. DETAILS OF THE EAP

Environmental Consultants International (Pty) Ltd

Postal Address:

Postnet Suite #150
Private Bag X1
Woodhill
0076

Physical Address:

Building 8
Mooikloof Office Park West
Pretoria
0084

Tel: 012 942 966

Email: hanlie@ecinational.co.za

2.1 Environmental Consultants International (Pty) Ltd

The consultants of ECI have been providing environmental management services in the following areas since 1991:

- Strategic Assessment & Planning
- Site selection & Due Diligence
- Landscape Architecture
- Land Management Plans
- Environmental & Social Impact Assessment
- Licensing Applications
- Biodiversity Assessments
- Monitoring & Auditing
- Public Consultation & Stakeholder Engagement
- Peer Reviews
- Environmental Advisory Services

2.2 Expertise and Experience of the EAP

Hanlie Van Greunen has a BSc degree in Landscape Architecture and a BSc Honours degree in Environmental Monitoring and Modelling and is a member of the International Association for Impact Assessment of South Africa (IAIAsa Member 6022). With 15 years' experience in the environmental industry her key performance areas include Environmental Licensing (Basic Assessment, Scoping and EIA, Water Use License Application, Waste Management Application, Air Emission License Application), Environmental Compliance Auditing, Visual Impact Assessment and Project Management.

3. PROJECT DESCRIPTION

3.1 General Project Description

The Proponent intends to construct a retreat on Portion 58 of the Farm Kromdraai 520 JQ in the Cradle of Humankind World Heritage Site (CoHWHs), Mogale City Local Municipality (MCLM), Gauteng.

The proposed development includes scheduled activities under the 2014 EIA Regulations in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended (NEMA) resulting in the need for Environmental Authorisation (EA) from the DEFF.

Activities applied for under NEMA include GN R No. 327 (Listing Notice 1, Activities 19 and 27) and GN R No. 324 (Listing Notice 3, Activities 4, 6, 12 and 14). Refer to **Figure 1: Locality Map**.

3.2 Specific Activities Covered by the EMPr

Project Fifty-Eight aims to develop a tourism facility on Portion 58 of the Farm Kromdraai 520 JQ. The proposed facility can be defined as “a place to restore conscious appreciation for life in all its manifestations and create a model for a regenerative society”. The property size is approximately 163.3 hectares (ha) in extent and the proposed development will have a maximum development footprint of approximately 8.16 ha (therefore below 5% of the total property size).

The facility will consist of the following components and will be able to accommodate a maximum of 150 guests:

- Six (6) 275 m² residential villas;
- Sixteen (16) 175 m² residential villas;
- Eighteen (18) 65 m² residential suites;
- Nineteen (19) 40 m² residential rooms;
- Six (6) 10 m² residential pods;
- 200 m² wellbeing facility (incl. hydrotherapy, treatments rooms and a gym);
- 600 m² 23-room residency;
- 550 m² lounge/event space;
- 200 m² restaurant, and
- 520 m² central facilities

Refer to **Figure 2: Layout Plan**

3.3 Identified Impacts

Although a number of potential short and long-term environmental and social impacts can be expected during the construction and operational phases of the Proposed Activity, it was found that the significance of these impacts could be reduced through the implementation of appropriate mitigation measures. Refer to **Table 1**.

Table 1: Identified Impacts (before and after mitigation)

Construction Phase Impacts	Impact significance	
	Before Mitigation	After Mitigation
Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage	High	Medium
Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste.	High	Medium
Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surface	High	Medium
Potential impacts on vegetation and loss of habitat	High	Medium
Potential impacts on the availability of groundwater	High	Medium
Impacts on ambient air quality dust and noise generation	High	Medium
Change in the visual character of the area	Medium	Low
Potential impacts on existing cultural and heritage resources	High	Medium
Potential impacts on traffic	Medium	Low
Economic development, tourism growth and job creation	High Positive	

Operational Phase Impacts	Significance after Mitigation	
	Alternative 1	Alternative 2
Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage	High	Medium
Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste	Medium	Low
Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surface	High	Medium
Potential impacts on vegetation and loss of habitat	High	Medium
Potential impacts on the availability of groundwater	High	Medium
Impacts on ambient air quality dust and noise generation	Medium	Low
Change in the visual character of the area	Medium	Low
Potential impacts on traffic	High	Medium
Economic development, tourism growth and job creation	High Positive	



Figure 1: Location Map

4. ADMINISTRATIVE STRUCTURE AND RESPONSIBILITIES

4.1 Roles and Responsibilities

PRINCIPAL AGENT / DEVELOPER
<ul style="list-style-type: none"> • Ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and subcontractors for the execution of the proposed project. • Ensure that the Contractor/s is aware of all specifications, legal constraints and standards and procedures pertaining to the project specifically with regards to the environment. • Ensure that all stipulations within the EMPr are communicated and adhered to by its appointed Contractor(s).

CONTRACTOR
<ul style="list-style-type: none"> • Appoint an Environmental Control Officer (ECO) for the contract. • Ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and subcontractors for the execution of the proposed project. • Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA; • Be responsible for the overall implementation of the EMPr in accordance with the requirements of the contract specifications; • Ensure that all third parties who carry out all or part of the contractor's obligations under the contract comply with the requirements of this EMPr; • Adhering to any instructions issued by the SHE Officer on advice of the ECO; and • Arrange for all employees and those of sub-contractors to receive training before the commencement of construction in order that they are aware of the conditions of the EMPr.

ENVIRONMENTAL CONTROL OFFICER (ECO)
<ul style="list-style-type: none"> • Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing • Reviewing and approving construction method statements with input from the ESO and engineer, where necessary, to ensure that the environmental specifications contained within this EMPr and EA are adhered to; • Monitor the implementation of the EMPr during construction activities until the site is handed over by the Contractor. • Be fully conversant of the recommendations and mitigation measures of all authorisations, permits and this EMPr for the project. • Ensure site protection measures are implemented on site. • Ensure that the Principal Contractor, sub-contractors, construction teams and the Principal Agent comply with the EMPr at all times.

- Monitor all site activities for compliance.
- Conduct audits of the site according to the EMPr, and report findings to the Principal Agent/Contractor.
- Recommend corrective action for any environmental non-compliance at the site and issue instructions to the contractor where environmental considerations call for action to be taken.
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions.
- The ECO shall submit regular written reports to the Developer, the Principal Agent (if not the Developer) and the environmental authority (DEFF) monthly or as required.
- Conduct once-off training with the Contractor on the EMPr and general environmental awareness.
- Submission of an environmental audit report to the Client and Principal Agent upon completion of the project.
- It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance.
- Ensuring compliance is the responsibility of the Principal Agent and the SHE Officer.
- Identifying and facilitating any amendments to the EMPr that may become necessary during construction

SAFETY HEALTH AND ENVIRONMENT (SHE) OFFICER

- Be fully conversant with the Environmental Management Programme.
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them.
- Compilation of Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved.
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor.
- Undertake regular and comprehensive inspection of the site and surrounding areas to monitor compliance with the EMPr.
- Take appropriate action if the specifications contained in the EMPr are not followed.
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr.
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr.
- Submit a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Ensure that the list of transgressions issued by the ECO is available on request.

- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
 - Public involvement / complaints
 - Health and safety incidents
 - Incidents involving hazardous materials stored on site
 - Non-compliance incidents.

5. TRAINING AND ENVIRONMENTAL AWARENESS

The Contractor's Team must have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The Contractor shall ensure that its employees and sub-Contractors who carry out all or part of the Contractor's obligations are adequately trained regarding the implementation of the EMPr, as well as environmental legal requirements and obligations. Training shall be conducted by the Contractor SHE/EO as and when required, as determined by the ECO. The environmental training is aimed at:

- Promoting environmental awareness;
- Informing the Contractor of all applicable environmental procedures, policies and programmes;
- Providing generic training on the implementation of environmental management specifications; and
- Providing job-specific environmental training to understand the key environmental features of the construction site and the surrounding environment.

Training will be done in a verbal and visual format. The training will be a once-off event; however the Contractor should make provision for weekly training or Toolbox Talks. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimised and environmental compliance maximised.

The Contractor will ensure that records of all training interventions are kept in accordance with the record keeping and documenting control requirements as set out in this EMPr and records must be sent to the ECO at intervals determined by the ECO. The training records shall verify each of the targeted personnel's training experience. If necessary, the ECO and/or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear.

The Environmental Training shall address the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of all work activities;
- The environmental benefits of improved personal performance;
- Workers' roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the EA, EMPr and relevant permits, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.

- Environmental legal requirements and obligations;
- Details regarding floral/faunal species of special concern and protected species and the procedures to be followed should these be encountered during the construction of the bridge, main access roads, approach roads or construction camps;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

6. DETAILED ENVIRONMENTAL MANAGEMENT PLAN

6.1 Pre- Construction / Planning Phase

Requirements for the Pre-construction phase include:

- Section 38 approval in terms of the NHRA approval must be obtained from SAHRA prior to commencement.
- Section 50 approval in terms of NEM:PAA must be obtained from the CHKWHS Management Authority prior to commencement.
- A WULA needs to be obtained from the Department of Human Settlements Water and Sanitation prior to commencement.
- A Stormwater Management Plan in line with the sustainable urban design standards (SUDS) must be approved by MCLM and implemented during the construction and operational phases of the project.
- A services survey (of all above and underground infrastructure) must be undertaken and Wayleave must be obtained from the MCLM prior to commencement of construction.
- An Emergency Response Plan must be developed and implemented.
- Proper, timeous, and continuous liaison between the developer, the contractor and landowners to ensure all parties are appropriately informed at all times.

- The developer must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project and a declaration of implementation must be signed by the Developer, Contractor and ECO.
- The EMPr must be updated with general and specific Conditions of the Environmental Authorisation as well as the Water Use License.
- A detailed site layout plan should be submitted to the Engineer and ECO, and be available on site for inspection.
- All man-made as well as natural (vegetation) structures outside the boundary of the development footprint shall be protected against damage at all times and any damage shall be reported and rectified immediately. Proper documentation and record keeping of all complaints and actions taken.
- The adjacent landowners must be informed of the starting date of construction as well as the phases in which the construction shall take place.
- A formal communications protocol should be set up during this phase. The aim of the protocol is to ensure that effective communication on key issues that may arise during construction is maintained between key parties such as the ECO, PM, Environmental Officer (EO) and Contractor.
- Environmental awareness training should be conducted for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts.
- Continuous awareness and training programs shall be implemented and updated.

6.2 Construction Phase

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
6.2.1 Site Preparation and Establishment				
Site preparation activities	Damage to surrounding areas	<ul style="list-style-type: none"> The footprint (clearance area) must be minimised. The area to be cleared must be clearly demarcated and this footprint strictly maintained. Access to the non-perennial drainage lines (including a 30-meter buffer) must be zoned as “no-go” during the construction phase (except for implementation of approved stormwater infrastructure). 	Prior to commencement and ongoing	Contractor
	Erosion of topsoil	<ul style="list-style-type: none"> Prior to the commencement of earthworks, the Contractor should determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks (including the building footprints, working areas and storage areas). The SHE Officer and ECO will identify a suitable area for the storage of topsoil. It will be stored until it can be used for rehabilitation. Removal of vegetation should be avoided until soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. 	Prior to commencement and ongoing	Contractor
	Geotechnical mitigation	<ul style="list-style-type: none"> The proposed structures can be constructed on shallow foundations such as strip footings with loads of up to 100kPa with the material under the foundations being removed and replaced down to a depth of 1.5 times the foundation width. The compacted material can be: 	Ongoing	Contractor

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> ○ The in situ material, give the PI is less than 15, in Area 1 and that H1 building requirements are followed as per SANS 10400-H ○ The in situ material, give the PI is less than 15, in Area 2 and that dolomite stability conditions described above are taken into consideration ○ The in situ material, in Area 3 ○ The residual soil or weathered rock material in Area 4. ● In Area 4 the foundations can be placed directly onto in situ soils if excavation inspections reveal these to be stiff or medium dense and not excessively plastic. ● The excavation of shallow foundation trenches is expected to be feasible with a backactor with only limited areas expected to required rock picking either by hand or with pneumatic tools. ● Road pavement layers can be won on site, but base coarse materials will need to be imported for sealed roads. Concrete aggregate is not likely to be available from site excavations. ● Underground steel services should be protected from moderately corrosive soil conditions. 		
Storage of materials including hazardous materials	Incorrect storage of material has the potential to pollute surface water resources as well as soils.	<ul style="list-style-type: none"> ● Choice of site for the Contractor's storage area requires the ECO's approval and must consider ecologically sensitive areas, including flood and drainage lines. ● Adequate waste management measures must be implemented preventing possible illegal dumping and littering of adjacent sensitive areas. ● The excavation and use of rubbish pits are forbidden. 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • A fenced area must be allocated for waste sorting and disposal. • Individual skips for different types of waste should be provided. • A site plan/layout (indicating areas for storage of hazardous chemicals, ablution facilities, waste yards, etc.) must be submitted to the ECO for approval. • Storage areas must be designated, demarcated and fenced/secured (in the case of hazardous materials). • A walled concrete platform, dedicated store with adequate flooring or bermed (110% capacity) area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. • Clear signage must be placed at all storage areas containing hazardous materials/substances. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible, the available MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Storage of potentially hazardous materials should be above any 100-year flood line, or as agreed with the ECO. • Sufficient care must be taken when handling hazardous materials/substances to prevent pollution. Staff dealing with these hazardous materials/substances must be aware of their potential impacts and follow the appropriate safety measures. • Concrete or cement are not to be mixed on bare soil but only in a suitable mixing tray. 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site at a licenced hazardous waste site. • Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; • Portable septic toilets are to be provided and maintained for construction crews. Maintenance must include their removal without sewage spillage. • Portable septic toilets are to be located outside of the 1:100 year floodline. • Spilled hydrocarbons shall be treated with oil absorbent such as Drizit or similar and this material should be disposed at an approved waste site. • Topsoil or soil polluted by hazardous substances or cement should also be disposed at an approved waste site. • In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Human Settlements Water and Sanitation (DHSWS) must be informed immediately. • Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEFF as stipulated in the conditions of the Environmental Authorisation. • Keep written records detailing the necessary information regarding the spill and remedial measures implemented. Such progress reporting is important for monitoring and 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		auditing purposes and the written reports may afterwards be used for training purposes to prevent similar future occurrences.		
6.2.2 Flora				
Vegetation Clearance	Potential impacts on vegetation and loss of habitat	<ul style="list-style-type: none"> • The entire private open space or conservation area must be fenced off prior to construction activities. • Provision of adequate toilet facilities must be implemented to prevent the possible contamination of ground (borehole) water in the area. • All temporary stockpile areas, litter and dumped material and rubble must be removed on completion of construction. • All alien invasive plant and tree species should be removed from the site to prevent further invasion. • Vegetation clearance should be restricted to the areas under construction allowing remaining animals opportunity to move away from the disturbance. • No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. No hunting with firearms (shotguns, air rifles or pellet guns) or catapults should be permitted on the property as well as neighbouring areas. 	Weekly	Contractor & ECO
6.2.3 Soils				
Storage and replacement of topsoil	Erosion of topsoil resulting in loss of topsoil and nutrients,	<ul style="list-style-type: none"> • During construction a sufficient Stormwater Management Plan should be implemented to prevent 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
	flooding and downstream siltation	<p>sedimentation taking place as a result of vegetation clearance and compaction of soil.</p> <ul style="list-style-type: none"> • Clearing activities and earth scraping should preferably be restricted to the dry season in order to prevent erosion and siltation of the adjacent non-perennial drainage lines. • Soil stockpiling areas must follow environmentally sensitive practices and be situated a sufficient distance away from drainage areas. • The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site. • Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • As much vegetation as possible should remain on site wherever possible to help decrease surface water flow velocity, and increase filtration. • Backfill must be compacted to form a stabilised and durable blanket. • Topsoil must be reused where possible to rehabilitate disturbed areas to facilitate re-growth of species that occur naturally in the area. • Stockpiled topsoil should be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious weeds, which would adversely affect its suitability for planting. • Where excessive loose sediment is created, attenuation swales and / or soils screens should be installed. 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • No stockpiles or construction materials may be stored or placed within any drainage line on site, or in areas where water naturally accumulates. • Stockpiles must not exceed more than 2m in height. • Any stockpile stored for long periods must be retained in a bermed area. • Ensure silt fences and sediment curtains are inspected on a weekly basis and after any rainfall events exceeding 10mm. • Where soils have been compacted, these should be loosened to a depth of 30cm. • All erosion control mechanisms need to be regularly maintained. • After construction, the site should be contoured to ensure free flow of runoff and to prevent ponding of water. • Drainage must be controlled to ensure that runoff from the site will not culminate in off-site pollution or result in rill and gully erosion in the non-perennial drainage lines. 		
6.2.4 Surface Water				
General construction activities	Poor storm water management could lead to the siltation (pollution) of down stream watercourses	<ul style="list-style-type: none"> • Construction of temporary soil berms should be erected at the edge of the cleared area to ensure that no storm water carrying any pollutants leaves the active area. • The dumping of construction material, including fill or excavated material into, or close to surface water features that may then be washed into these features is prohibited. 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. • A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; • Oil residue shall be treated with oil absorbent such as Drizit or similar and this material removed to an approved waste site; • The bulk supply of wet concrete is the preferred method of concrete production over mixing of concrete on site. Concrete mixing, where used, is to be mixed on mixing trays only, not on exposed soil; • Stormwater shall not be allowed to flow through the batching area. Cement sediment shall be removed from time to time and disposed of in a manner as instructed by the ECO; • Concrete and tar (where applicable) shall be mixed only in areas which have been specially demarcated for this purpose; • All concrete and tar that is spilled outside these areas shall be promptly removed by the Contractor and taken to an approved dumpsite; • After all the concrete / tar mixing is complete all waste concrete / tar shall be removed from the batching area and disposed of at an approved dumpsite; 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • All construction materials liable to spillage are to be stored in appropriate structures with impermeable flooring; • Portable septic toilets are to be provided and maintained for construction crews. Maintenance must include their removal without sewage spillage. • Under no circumstances may ablutions occur outside of the provided facilities; • No uncontrolled discharges from the lay down areas (where applicable) to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority; • In the case of pollution of any surface or groundwater by hazardous substances, the Regional Representative of the Department of Water and Sanitation must be informed immediately; • Store all litter carefully so it cannot be washed or blown into any of the water courses within the study area; • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed; • The construction site should be cleaned daily and litter removed; • Conduct on-going contractor/staff awareness programs so as to reinforce the need to avoid littering; • Ensure all guidelines as specified in Department of Water Affairs and Forestry (2005b) are strictly adhered to. 		
6.2.5 Waste				
General waste generated on site	Pollution of surrounding areas	<ul style="list-style-type: none"> • The contractor must have a waste policy and waste management procedure and engage a service provider who 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<p>trains the operations staff on measures for implementing the plan as well as auditing.</p> <ul style="list-style-type: none"> • Conduct ongoing staff awareness programs so as to reinforce the need to avoid littering. • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed. • Waste bins should be cleaned out on a weekly basis by an appointed service provider to prevent any windblown waste and/or visual disturbance. • The construction site should be cleaned daily and litter removed. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. Bins should be clearly marked and lined for efficient control and safe disposal of waste. • A fenced area must be allocated for waste sorting and disposal on the site. • General waste produced on site is to be collected in skips for disposal at the local municipal waste site. A waste disposal service provider must be appointed by the contractor to carry out disposal of waste as required. Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site. • Under no circumstances is waste to be burnt or buried on site. • A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. • In the case of a spill of hydrocarbons, chemicals or bituminous substance, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity. • Reporting of spills and mitigation done must be done in accordance with section 10 of the minimum requirements for the handling, classification and disposal of hazardous waste (3rd edition, 2005). • Vehicles are to be checked for leakage before and after entering the construction area. 		
6.2.6 Air Quality				
General Construction Activities	Impacts adjacent landowners with regards to ambient air quality (dust and odour)	<ul style="list-style-type: none"> • Implement a programme of stakeholder communication that includes community engagement before and during work on site. • Provide a complaint register on site where complaints can be made. This register should enable effective communication of complaints details of steps taken to resolve complaints. • Clearly display the contact details of the environmental site office and manager at the site entrance. • Weekly site inspections should be undertaken in the vicinity of sensitive receptors. Records should be made of these routine inspections. 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Implement and maintain a Dust and Emission Management Plan which provides clear details on preventing, maintaining and improving the air quality in terms of site-specific activities. This plan could possibly incorporate a dust fallout monitoring programme should it be evident that dust emissions is a problem. • Should activities be undertaken during dry and windy conditions, special focus must be taken on the impact and results of the conditions to ensure that minimal impact is occurring. • Should the conditions require it, erect screens and barriers around the sensitive receptors. • Ensure that all areas, fencing, barriers and scaffolding is kept clear of debris and dust. • Ensure that all areas, fencing, barriers and scaffolding is kept clear of debris and dust. • Ensure that all vehicles are maintained in good working condition and that they are services on regular intervals. • Ensure that all vehicles are switched off when stationary- no vehicles should be idling for extended period. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Impose and regulate a speed limit of 30 km/h on the site at all times. • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Ensure an adequate water supply on the site for effective dust particulate matter suppression (non-potable water) where possible. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. • Only use registered waste carriers to take waste off-site. • Bonfires and burning of waste materials is prohibited. • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Only remove the cover in a small area during work and not all at once. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in appropriate storage with suitable emission control systems to prevent escape of material and overfilling during delivery. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as soon as practicable any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport 		

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Record all inspections of haul routes and any subsequent action in a site log book. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable. 		
General Construction Activities	Impacts adjacent landowners with regards to noise generation	<ul style="list-style-type: none"> • Construction site yards and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development site. • All construction vehicles and equipment are to be kept in good repair. • Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20dBA. • Portable acoustic shields should be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators). • Construction activities should be limited to 07:00 to 17:00 daily. • Machines in intermittent use should be shut down in the intervening periods between active working or throttled down to a minimum. • In general, construction activities should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment. 		
6.2.7 Visual				
General Construction Activities	Change in landscape character relating to construction activities	<ul style="list-style-type: none"> Locate the construction camps in areas that are already disturbed or where it is not necessary to remove established vegetation; Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth of at least 20% density and at least 3 metres high, as an additional screen; Exposed soil must be covered or 'camouflaged' using a biodegradable soil mat and vegetation cover to reduce the duration of visible scarring of the landscape; Retain the existing vegetation cover of the site through selective clearing, where practical; Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agent; Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements; Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and Monitor all areas for rehabilitation failure and implement remedial action immediately. 	Weekly	Contractor & ECO

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
6.2.8 Traffic				
Construction traffic	An increase of traffic and number of construction vehicles and trucks on the road during the construction period.	<ul style="list-style-type: none"> Place adequate advance warnings (Turning Trucks) along the R540. Manage the increase in construction traffic in terms of congestion, road surface damage, safety concerns, dust and erosion. All vehicular traffic on site should adhere to road safety measures; All vehicles should be road worthy; Only designated roads should be used for construction vehicles; Ensure drivers and operators of equipment are familiar with the safety policies and regulations. 		
6.2.9 Heritage				
Discovery of important cultural and historical artefacts	Important cultural and historical artefacts could be damaged or lost and graveyards disturbed	<ul style="list-style-type: none"> If an artefact or grave on site is uncovered, work in the immediate vicinity must be stopped immediately. The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Client or ECO of such discovery. A heritage expert will need to be contacted for the way forward. Work may only resume once clearance is given in writing by the Archaeologist. 	Initially and ad hoc thereafter	Contractor & ECO
6.2.10 Socio-economic				
	Labour and skills development	<ul style="list-style-type: none"> Unskilled and unemployed labour should be sourced from the surrounding local communities (AoI) as far as possible. It is suggested that non-locals should only be hired when 	Ongoing	Contractor/CLO/Community representatives

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<p>specialist skills, which are not available locally, are required and local business providing such skills cannot be created;</p> <ul style="list-style-type: none"> • Skills development opportunities should be granted to community members and local job seekers, where needed; • Make use of any existing skills databases and include the local councillor (Ward 39) and other representative community structures in the process; • Project contracts between the proponent and the principal contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks; and • Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures. 		
	Local procurement	<ul style="list-style-type: none"> • Local suppliers should be used as far as possible; and • Ensure that local businesses, especially those of HDSA, women and of SMMEs get allocated the maximum appropriate share of project related business opportunities. 	Ongoing	Contractor/CLO/ SMME's
	Stakeholder engagement	<ul style="list-style-type: none"> • Engagement with local communities must follow the culturally appropriate protocols in a manner that will strengthen the relationship between the client and the community; • Effective communication must involve both engagement and feedback processes; • A grievance mechanism, accessible to members of public, should be implemented and maintained. Such a register would provide a formal framework within which to record any comments and complaints received, as well as to 	Ongoing	Contractor/CLO/ Community representatives

Aspect	Impact	Measures and Controls	Monitoring Frequency	Responsible Person(s)
		<p>identify and action appropriate mitigation and/or remediation measures. The register should also include a means of recording and communicating the close-out of issues;</p> <ul style="list-style-type: none"> • Engage with the local community representatives to dispense information relating to the project, possible employment opportunities and channels of communication (especially in terms of grievances); and • Engagement with community representatives, ward councillors and other existing community forums should be done to inform the general public about the project and project related impacts or opportunities, especially with reference to the monitoring of impacts. 		
6.2.11 Rehabilitation				
	Rehabilitation of all impacted areas	<ul style="list-style-type: none"> • Left-over excavated material should be removed from site (no stockpiles to remain). • All affected and compacted areas must be scarified to a depth of 200mm in order to encourage natural re-vegetation. 	Upon completion and one month after completion	Contractor & ECO

6.3 Operational Phase

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
6.3.1 Flora				
	Potential impacts on vegetation and loss of habitat	<ul style="list-style-type: none"> • Access to the non-perennial drainage lines must be limited to low-impact activities during daylight hours (hiking, bird-watching, meditation and relaxation). • Landscaped areas around the proposed development should be planted with indigenous (preferably using endemic or local species from the area) grasses, forbs, shrubs and trees, which are water wise and require minimal horticultural practices. A species list of suitable species should be compiled for the property owner. • A Re-vegetation and Rehabilitation Manual should be prepared for the use of contractors, landscape architects and groundsmen. Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. 	Ongoing	Operator/ Owner
6.3.2 Soils				
General Activities	Potential impacts on soil and ground and surface water quality that may occur as a result of the spillage of hydrocarbons, hazardous chemicals and sewage.	<ul style="list-style-type: none"> • A walled concrete platform, dedicated store with adequate flooring or bermed (110% capacity) area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used. 	Ongoing	Operator/ Owner

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Spilled hydrocarbons shall be treated with oil absorbent such as Drizit or similar and this material should be disposed at an approved waste site. • All maintenance vehicles should be kept in good working condition; • All maintenance vehicles should be parked in demarcated areas when not in use and drip trays should be placed under vehicles to collect any spillages/ leaks; • In the case of pollution of any surface or groundwater, the Regional Representative of the DHSWS must be informed immediately. 		
6.3.3 Surface Water				
Rehabilitated areas	Alien and Invasive infestation Destruction Increased soil erosion as a result of vegetation clearance and increased stormwater runoff from hard surfaces	<ul style="list-style-type: none"> • Vehicular and pedestrian movement must be limited to the established roads and footpaths. • If any signs of erosion occur in high trafficked areas or as a result of concentrated flow of stormwater runoff these areas should be rehabilitated according to instructions from a qualified Ecologist. 	Following the first rain after completion and then on a bi-annual basis until successful re-vegetation.	Operator/ Owner

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
6.3.4 Waste				
Domestic waste and biowaste generated on site	Potential impacts on soil and ground and surface water quality that may occur as a result of the generation of waste.	<ul style="list-style-type: none"> • Domestic waste generated on site must be removed on a weekly basis. • Waste must be stored in a central location in a suitable container (not on bare soil) until collection. • Storage containers must have lockable lids to prevent any windblown waste and/or accessibility to wild animals. • Provide bins for staff and residents at appropriate locations, particularly where food is consumed. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. Bins should be clearly marked and lined for efficient control and safe disposal of waste. • Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site. • Under no circumstances is waste to be burnt or buried on the site. 	Weekly	Operator/ Owner
6.3.5 Air Quality				
General Operational Activities	Impacts adjacent landowners with regards to ambient air quality (dust and odour)	<ul style="list-style-type: none"> • Implement a programme of stakeholder communication that includes community engagement before and during work on site. • Provide a complaint register on site where complaints can be made. This register should enable effective communication of complaints details of steps taken to resolve complaints. 	Weekly	Operator/ Owner

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Clearly display the contact details of the environmental site office and manager at the site entrance. • Weekly site inspections should be undertaken in the vicinity of sensitive receptors. Records should be made of these routine inspections. • Implement and maintain a Dust and Emission Management Plan which provides clear details on preventing, maintaining and improving the air quality in terms of site-specific activities. This plan could possibly incorporate a dust fallout monitoring programme should it be evident that dust emissions is a problem. • Ensure that all vehicles are maintained in good working condition and that they are services on regular intervals. • Ensure that all vehicles are switched off when stationary- no vehicles should be idling for extended period. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Impose and regulate a speed limit of 30 km/h on the site at all times. • Ensure an adequate water supply on the site for effective dust particulate matter suppression (non-potable water) where possible. • Only use registered waste carriers to take waste off-site. • Bonfires and burning of waste materials is prohibited. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Record all inspections of haul routes and any subsequent action in a site log book. 		

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
	Impacts adjacent landowners with regards to noise generation	<ul style="list-style-type: none"> • Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20dBA. • Operational activities should be limited to 07:00 to 17:00 daily. • Machines in intermittent use should be shut down in the intervening periods between active working or throttled down to a minimum. • In general, operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). • Staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment. 	Weekly	Operator/ Owner
6.3.6 Visual				
General Operational Activities	Change in landscape character relating to construction activities	<ul style="list-style-type: none"> • Natural trees, shrubbery and grass species must be retained wherever possible; • Trees with good screening properties must be utilised in sections where direct views is visible. • The ecologist must approve the tree species to be utilised for screening purposes. • Structures must be painted using earthy colours to blend in with ridgeline and vegetation; • Treat all steelwork with a matt paint to limit reflection; • Be sensitive towards the use of glass or materials with a high reflectivity to avoid glare from the shiny surfaces and to avoid visual discomfort for viewers during the day; 	Weekly	Operator/ Owner

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
		<ul style="list-style-type: none"> • Deflect all external lighting downwards, and • Maintain the facility to a high standard (buildings as well as landscaping). 		
6.3.7 Traffic				
Operational traffic	An increase of traffic and number of vehicles, including trucks, on the road	<ul style="list-style-type: none"> • Servitudes registered over Portions 17 and 22 of the farm Kromdraai 520-JQ. A formal access to the development is proposed to be constructed at the existing eastern access off the R374. • All vehicular traffic on site should adhere to road safety measures. 	Weekly	Operator/ Owner
6.3.7 Socio-economic				
	Labour and skills development	<ul style="list-style-type: none"> • Unskilled and unemployed labour should be sourced from the surrounding local communities (Aol) as far as possible. It is suggested that non-locals should only be hired when specialist skills, which are not available locally, are required and local business providing such skills cannot be created; • Skills development opportunities should be granted to community members and local job seekers, where needed; • Make use of any existing skills databases and include the local councillor (Ward 39) and other representative community structures in the process; • Project contracts between the proponent and the principal contractor should stipulate the use of local 	Ongoing	Owner/ Community representatives

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
		labour for unskilled and semi-skilled positions and tasks; and <ul style="list-style-type: none"> • Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures. 		
	Local procurement	<ul style="list-style-type: none"> • Local suppliers should be used as far as possible; and • Ensure that local businesses, especially those of HDSA, women and of SMMEs get allocated the maximum appropriate share of project related business opportunities. 	Ongoing	Owner/ SMME's
	Stakeholder engagement	<ul style="list-style-type: none"> • Engagement with local communities must follow the culturally appropriate protocols in a manner that will strengthen the relationship between the client and the community; • Effective communication must involve both engagement and feedback processes; • A grievance mechanism, accessible to members of public, should be implemented and maintained. Such a register would provide a formal framework within which to record any comments and complaints received, as well as to identify and action appropriate mitigation and/or remediation measures. The register should also include a means of recording and communicating the close-out of issues; • Engage with the local community representatives to dispense information relating to the project, possible 	Ongoing	Owner/ Community representatives

Aspect	Impact	Measures and controls	Monitoring Frequency	Responsible Person(s)
		employment opportunities and channels of communication (especially in terms of grievances); and <ul style="list-style-type: none"> • Engagement with community representatives, ward councillors and other existing community forums should be done to inform the general public about the project and project related impacts or opportunities, especially with reference to the monitoring of impacts. 		

6.4 Closure and/or Decommissioning Phase

The closure and/or decommissioning of the proposed development is not envisaged at this stage. Should this become necessary, the developer or owner of the activity must appoint a suitably qualified professional to develop a site specific EMPr.