

Environmental Impact Assessment
Draft Basic Assessment Report

**Baillie Park Extension 63 township establishment
and associated infrastructure on Portion 1108
of the farm Vyfhoek 428 IQ
JB Marks Local Municipality
North West Province**

Applicant: Ivy's Tour Packages (Pty) Ltd

PO Box 1505, Middelburg, 1050

Contact person: Yvonne Davel-Jacobs

Tel +27(0)79 343 1665 Email: ivydj123@gmail.com

Submitted By: Texture Environmental Consultants

44 Melrose Blvd, Melrose Arch, Johannesburg

Contact Person: Mientjie Coetzee

Tel: 083 253 2246 Email: mientjie@peopletexture.co.za

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TABLE OF CONTENTS

TABLE OF CONTENTS	2
APPENDICES	3
GLOSSARY OF TERMS	4
ACRONYMS	8
1 INTRODUCTION	9
2 THE BASIC ASSESSMENT PROCESS	9
3 DETAILS OF ENVIRONMENTAL SERVICE PROVIDER	12
3.1 LEGISLATIVE REQUIREMENTS FOR ENVIRONMENTAL ASSESSMENT PRACTITIONERS	12
3.2 DETAILS OF THE EXPERTISE OF THE RELEVANT EAP	12
4 DESCRIPTION OF THE ACTIVITY	14
5 PROPERTY DESCRIPTION AND LOCALITY	19
6 LEGAL AND OTHER REQUIREMENTS	22
6.1 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES	22
6.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT	25
7 NEED AND DESIRABILITY	26
7.1 NEED	26
7.2 DESIRABILITY	27
8 ALTERNATIVES	28
8.1 INTRODUCTION	28
8.2 MOTIVATION FOR THE PREFERRED ALTERNATIVES	31
9 DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROPOSED DEVELOPMENT	32
9.1 BIO-PHYSICAL	32
9.2 SOCIO-ECONOMIC	49
9.2.3 ARCHAEOLOGY AND CULTURAL SITES	49
9.2.4 VISUAL IMPACT	57
9.2.5 SOCIO ECONOMIC IMPACT	57
10 ENVIRONMENTAL IMPACT ASSESSMENT	58
10.1 PLANNING AND DESIGN PHASE	59
10.2 CONSTRUCTION PHASE	64
10.3 OPERATIONAL PHASE	85
11 PUBLIC PARTICIPATION	93
11.1 ADVERTISEMENT AND NOTICE	93
11.2 PUBLIC NOTIFICATION	93
11.3 DISTRIBUTION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT	94
11.4 COMMENTS AND RESPONSE REPORT	94
11.5 COMMENTS ON DRAFT BAR	94
11.6 CONCLUSION PUBLIC PARTICIPATION PROGRAMME	94
12 ENVIRONMENTAL IMPACT STATEMENT	95
13 RECOMMENDATIONS	99
14 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE	100

APPENDICES

APPENDIX A *EAP DETAILS AND EXPERIENCE*

APPENDIX B *EAP PROFESSIONAL REGISTRATION*

APPENDIX C *LAYOUT PLAN*

APPENDIX D *SPECIALIST STUDIES*

1. *Civil Engineering Services Report*
2. *Electrical Services Report*
3. *Traffic Impact Assessment Report*
4. *Geotechnical Report*
5. *Biodiversity Assessment Report*
6. *Heritage Impact Assessment Report*

APPENDIX E *PUBLIC PARTICIPATION*

1. *Proof of placement of advertisements*
 - a) *Proof of site notice*
 - b) *Proof of newspaper notice*
2. *Proof of written notification*
 - a) *Background Information Document (BID) and Registration sheet*
 - b) *Submission of notification letters*
 - c) *Submission of draft Basic Assessment Report*
3. *Comment received*
 - a) *Written comment received in the notification phase*
 - b) *Written comments received on the DBAR*
4. *Registers*
 - a) *Register of I&APs*
5. *Correspondence and minutes of meetings*
 - a) *Public information meetings/virtual meetings – no meeting requested*
6. *Comments and Response Report*

APPENDIX F *ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)*

GLOSSARY OF TERMS

Activity (Development) – an action either planned or existing that may result in environmental impacts through pollution or resource use.

Alien vegetation - Alien vegetation is defined as undesirable plant growth (usually of foreign origin) which includes, but is not limited to all declared category 1 and 2 listed invader species as set out in the 1983 Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien are those plant species that show the potential to occupy in number any area within the defined construction area and which are declared undesirable.

Alternative – a possible course of action, in place of another, of achieving the same desired goal of the proposed project. Alternatives can refer to any of the following but are not limited to: site alternatives, site layout alternatives, design or technology alternatives, process alternatives or a no-go alternative. All reasonable alternatives must be rigorously explored and objectively evaluated.

Applicant – the project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.

Biodiversity – the diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.

Construction – means 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.

Cumulative Impacts – impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities to produce a greater impact or different impacts.

Direct impacts – 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.

Ecosystem – a dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.

Emmissions - The release or discharge of a substance into the environment which generally refers to the release of gases or particulates into the air.

Environment – In terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) (as amended), “Environment” means the surroundings within which humans exist and that are made up of:
a) the land, water and atmosphere of the earth;
b) micro-organisms, plants and animal life;
c) any part or combination of (i) of (ii) and the interrelationships among and between them; and

d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Assessment (EA) – 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 – 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 – a change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation’s activities, products or services.

Environmental Impact Assessment (EIA) – the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

Environmental Issue – a concern raised by a stakeholder, interested or affected parties about an existing or perceived environmental impact of an activity.

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 - 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. The EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

Expansion - means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.

Fatal Flaw – issue or conflict (real or perceived) that could result in developments being rejected or stopped.

General Waste – household water, construction rubble, garden waste and certain dry industrial and commercial waste which does not pose an immediate threat to man or the environment.

Hazardous Waste – waste that may cause ill health or increase mortality in humans, flora and fauna.

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 of 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 particular 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).

Mitigate – the implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

No-Go Option – in this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

Open Space – environmentally sensitive areas which are not suitable for development and consist of watercourses, buffers, floodplains, steep slopes, sensitive biodiversity and/or areas of cultural or heritage significance.

Registered Interested and Affected Party – an interested and affected party whose name is recorded in the register opened for that application.

Rehabilitation – a measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

Scoping – the process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

Sensitive environment – any environment identified as being sensitive to the impacts of the development.

Significance – significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

Stakeholder engagement – the process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

Sustainable Development – development which meets the needs of current generations without hindering future generations from meeting their own needs.

Watercourse – means:

- a) a river or spring;
- b) a natural channel or depression in which water flows regularly or intermittently;
- c) a wetland, lake or dam into which, or from which, water flows; and
- d) 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 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

Wetland – means 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.

ACRONYMS

CBA	Critical Biodiversity Areas
CBD	Central Business District
CMA	Catchment Management Agencies
CSIR	Council for Scientific and Industrial Research
DEDECT	Department of Economic Development, Environment, Conservation and Tourism
DMRE	Department of Mineral Resources and Energy
DSOE	Desired State of the Environment
DWS	Department of Water and Sanitation
ECF	Environmental Constraints Framework
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIS	Ecological Importance & Sensitivity
EMC	Environmental Management Class
EMP	Environmental Management Plan
EWR	Ecological Water Requirements
GIS	Geographic Information System
HGM	Hydrogeomorphic
IBA	Important Bird Area(s)
IDP	Integrated Development Plan
I&AP	Interested and/or affected parties
MAP	Mean Annual Precipitation
MASL	Metres above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act
PAES	Protected Areas Expansion Strategy
PES	Present Ecological State
PDA	Primary Drainage Area
PPP	Public participation process
QDA	Quaternary Drainage Area
REC	Recommended Ecological Category (or Class)
REMC	Recommended Ecological Management Category (or Class)
RVI	Riparian Vegetation Index
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SDI	Spatial Development Initiative
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SWSA	Strategic Water areas of South Africa
WMA	Water Management Areas
WUL	Water Use Licence
WULA	Water Use Licence Application

1 INTRODUCTION

Texture Environmental Consultants has been appointed as the independent environmental assessment practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed Baillie Park Ext 63 township development and associated infrastructure on Portion 1108 of the farm Vyfhoek 428 IQ, JB Marks Local Municipality, North West Province. The site (Portion 1108 of the farm Vyfhoek 428 IQ) is 9.1745 hectares in extent and is located to the eastern side of Potchefstroom, east of the Baillie Park residential neighbourhood and north of the Turfvlei Agricultural Holdings. The project is on the southern side of Kanaal avenue, approximately 400 m east of Modderdam road. The applicant is Ivy's Tour Packages (Pty) Ltd.

Application for authorisation of the above project is to be submitted to the Department of Economic Development, Environment, Conservation and Tourism, North West Provincial Government (DEDECT), in terms of the National Environmental Management, 1998 (Act 107 of 1998), and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended on 7 April 2017) promulgated in Government Gazette 40772 and Government Notice (GN) R327, R326, R325 and R324.

The proposed project is a listed activity in terms of Sections 24(2) and 24(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (as amended). The Environmental Impact Assessment (EIA) Regulations, 2017 promulgated in terms of Chapter 5 of the NEMA provide for the control of certain activities that are listed in Government Notice Regulation (GN R.) No. 327, 325 and 324. Activities listed in these notices must comply with the regulatory requirements listed in GN R. 326, which prohibits such activities until written Authorisation is obtained from the Competent Authority. Such Environmental Authorisation (EA), which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations of 2017. GN R. No. 326 sets out the procedure and documentation that need to be compiled with undertaking a Basic Assessment Process.

2 THE BASIC ASSESSMENT PROCESS

In terms of Government Notice No. R. 326 of 7 April 2017, Appendix 1(1), the environmental outcomes, impacts and residual risks of the proposed activity must be set out in the basic assessment report.

In terms of Appendix 1(2) the objective of the basic assessment process is to, through a consultative process:

- Determine the policy and legislation context within which the proposed activity is located and how the activity complies with and conforms to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within the sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - The degree to which these impacts –
 - Can be reversed;
 - May cause irreplaceable loss of resources; and
 - Can be avoided, managed or mitigated.

- Through a ranking of the site sensitivities and possible impacts the activity and technological alternatives will impose on the sites and location identified through the life of the activity to:
 - Identify and motivate a preferred site, activity and technology alternative;
 - Identify suitable measures to avoid, manage or mitigate identified impacts; and
 - Identify residual risks that need to be managed and monitored.

In terms of Appendix 1(3) 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:

- Details of the EAP who prepared the report, and the expertise of the EAP, including a curriculum vitae;
- The location of the activity, including the 21 digit Surveyor General code of each cadastral land parcel, where available, the physical address and farm name (alternatively the coordinates of the boundary of the property or properties on which the activity is to be undertaken), coordinates of the activity on the property or properties and a map at an appropriate scale of the property on which the activity is to be undertaken clearly indicating the location of the activity on the property or properties;
- 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:

 - A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;
 - On land where the property has not been defined, the coordinates within which the activity is to be undertaken;
- A description of the scope of the proposed activity, including:
 - All listed and specified activities triggered and being applied for, and
 - A description of the activities to be undertaken including associated structures and infrastructure.
- A description of the policy and legislative context within which the development is proposed including 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 how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;
- 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;
- A motivation for the preferred site, activity and technology alternative;
- A full description of the process followed to reach the proposed preferred alternative within the site including:
 - Details of all the alternatives considered;
 - Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;
 - 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;
 - The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
 - 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:

- Can be reversed;
 - May cause irreplaceable loss of resources;
 - Can be avoided, managed or mitigated.
 - 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;
 - Description of the positive and negative impacts that the 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;
 - The possible mitigation measures that could be applied and level of residual risk;
 - The outcome of the site selection matrix;
 - If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such, and
 - A concluding statement indicating the preferred alternatives, including preferred location of the activity.
- A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in BAR through the life of the activity, including:
 - A description of all environmental issues and risks that were identified during the environmental impact assessment process; and
 - 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;
 - An assessment of each identified potentially significant impact and risk, including -
 - Cumulative impacts;
 - The nature, significance and consequences of the impact and risk;
 - The extent and duration of the impact and risk;
 - The probability of the impact and risk occurring;
 - The degree to which the impact and risk can be reversed;
 - The degree to which the impact and risk may cause irreplaceable loss of resources; and
 - The degree to which the impact and risk can be mitigated.
 - Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to the Regulations and an indication as to how these findings and recommendations have been included in the final report;
 - Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for inclusion in the EMPr;
 - 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;
 - A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
 - 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;
 - Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;
 - An undertaking under oath or affirmation by the EAP in relation to:
 - The correctness of the information provided in the reports;

- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;
- Where applicable, details of any financial provision for the rehabilitation, closure, and Ongoing post decommissioning management of negative environmental impacts;
- Any specific information that may be required by the competent authority; and
- Any other matters required in terms of section 24(4)(a) and (b) of the Act.

The content of this report has been structured in accordance with the above referred to requirements that have been laid down for basic assessment reports in Appendix 1(3) of the 2014 EIA Regulations as amended.

3 DETAILS OF ENVIRONMENTAL SERVICE PROVIDER

3.1 Legislative requirements for environmental assessment practitioners

Section 13 of Government Notice No. R. 326 of 7 April 2017 provides the following requirements for environmental assessment practitioners (EAPs):

- An EAP must be independent;
- An EAP must have expertise in conducting environmental impact assessments or undertake specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the activity.
- An EAP must ensure compliance with these Regulations;
- An EAP must perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- An EAP must take into account, to the extent possible, the matters referred to in regulation 18 of Government Notice No. R. 326 of 7 April 2017 when preparing the application and any report, plan or document relating to the application; and
- An EAP must disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing –
 - any decision to be taken with respect to the application by the competent authority in terms of these Regulations; or
 - the objectivity of any report, plan or document to be prepared by the EAP or specialist in terms of these Regulations for submission to the competent authority.

3.2 Details of the expertise of the relevant EAP

The members of Texture Environmental Consultants have combined expertise and a proven track record of initiating and completing major projects. We have experience of more than 18 years in EIA applications.

In order for the company to meet the emerging environmental challenges, Texture Environmental Consultants has assembled a team of professionals, consisting of a core of environmental experts with extensive experience in environmental assessments. The team includes environmentalists, various specialists, and public participation experts. A range of township development as well as linear projects

including water pipelines and power lines, agricultural development, including dams have been successfully completed over the years as indicated in our Experience Record.

The team is especially proficient in assisting the Client in understanding and determining environmental responsibility, potential impacts and giving guidance as to alternative approaches or identifying unforeseen environmental impacts.

Areas of expertise:

- Environmental Impact Assessment (EIA)
- Strategic Environmental Assessments (SEA)
- Environmental Compliance (incl. ECO)
- Public participation
- Specialist studies (Fauna, Flora, Avifauna, Wetland)
- Water related expertise and services i.e. Water Use License Applications, Integrated Water and Waste Management Plans, water use, and water quality assessments.

Refer to Table 1 and *Appendix A* for EAP details and experience and *Appendix B* for Professional Registration of EAP.

Table 1: EAP Details and Experience

Company	Texture Environmental Consultants (Pty) Ltd
Contact Persons	Mientjie Coetzee
Postal Address	44 Melrose Blvd Melrose Arch Johannesburg 2196
Telephone	083 253 2246
Facsimile	086 689 1515
E-mail	mientjie@peopletexture.co.za
Qualification	Master of Science
Professional Registrations	EAPASA Registration number 2019/1774 IAIAsa Membership number 3359
Experience	Mientjie Coetzee has 18 years' experience in the Environmental Sector and has gained experience as Environmental Assessment Practitioner and Project Manager working on a wide range of projects including residential, mixed land-use, industrial, roads and filling stations. Her primary skills include Environmental Screening Assessments, Environmental Impact Assessments (EIAs), Waste Management License Applications, Public Participation and Environmental Management Programmes (EMPrs).

Texture Environmental Consultants has no vested interest in the proposed development and hereby declares its independence as required by the EIA Regulations.

4 DESCRIPTION OF THE ACTIVITY

This application for Environmental Authorisation (EA) is for the construction of a proposed township, to be known as Baillie Park Ext 63, and associated infrastructure.

A Township Establishment Application for the proposed Baillie Park X 63 had been submitted to the JB Marks Local Municipality by Welwyn Town and Regional Planners. The project entails the township development consisting of the following land uses on a total footprint of 9.1745 hectares on Portion 1108 of the farm Vyfhoek 428 IQ:

Table 2: Proposed Land Uses

LAND USE	NUMBER	ERF NO.	AREA	%
Residential 1	45	1-45	4,6428 Ha	50.61
Institutional (Use for School Facility)	1	49	0,1021Ha	1.11
Business 3 (With Annexure)	3	46-48	2,2828 Ha	24.88
Private Open Space	1	50	0,3387 Ha	3.69
Private Road	1	51	1,4961 Ha	16.31
Public Roads			0,5136 Ha	3.40
TOTAL	51		9,1745 Ha	100.00

Refer to Figure 1: Layout Plan. The layout plan is also attached as Appendix C of the report.

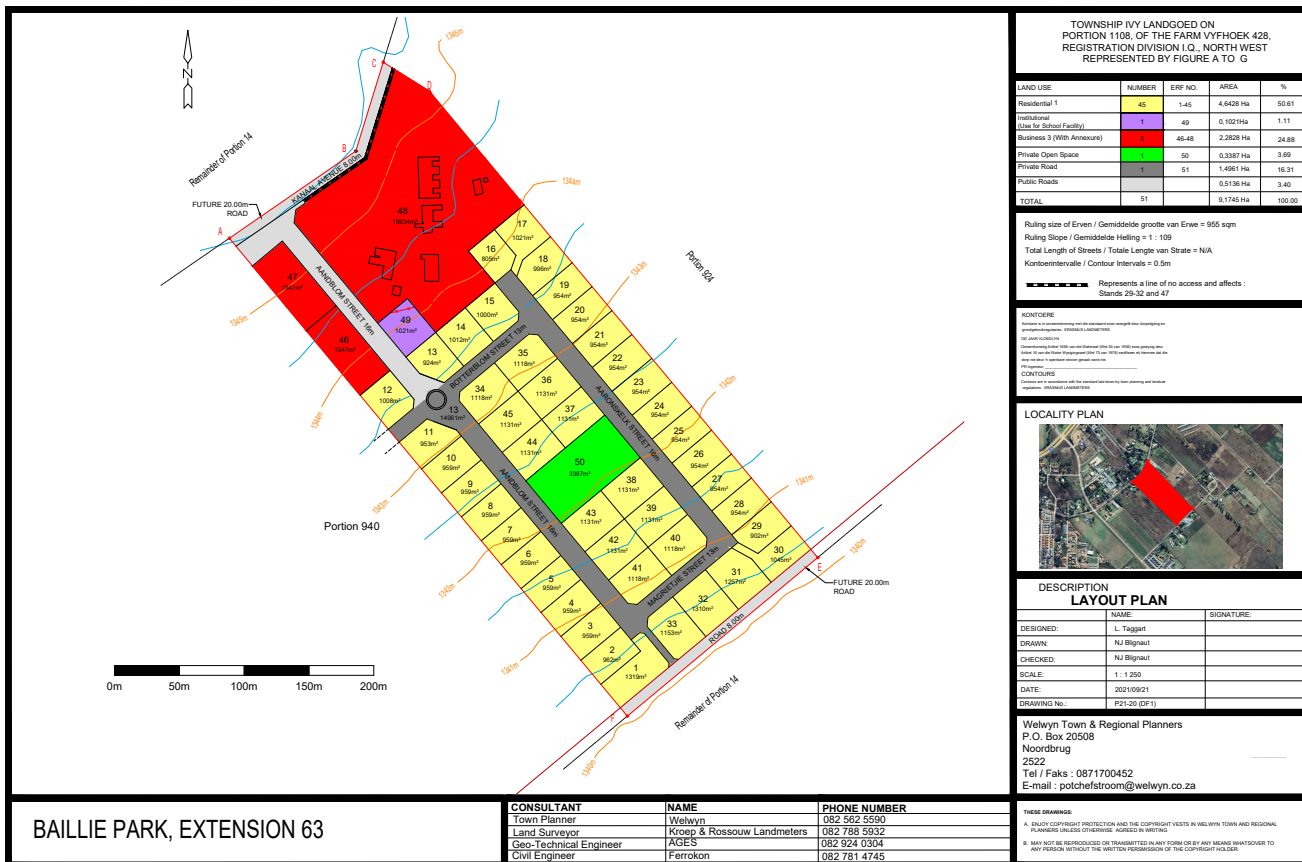


Figure 1: Layout Plan

Erf 1 - 45: “Residential 1” erven

Erf 1-45 is created to accommodate 45 residential units.

Erf 49: “Institutional” (use for School Facility) erf

Erf 49 is created to accommodate the intended institutional use with the purposes of a pre-school.

Erf 46 – 48: “Business 3” with Annexure erven

Erf 46-48 is created to Business 3 with an annexure, that a Restaurant and social hall also be permitted. The shop areas may only be subordinate to the main uses and limited to 100m² per erf. Commercial use will not be permitted. Business 3 zoning provides for a Lifestyle Centre that includes a social hall, restaurant, guest units, offices, and medical consulting rooms (care centre for the elderly).

Erf 50 – “Private Open Space” erf

Erf 52 is created to accommodate the proposed private space that may be used for the purpose of promoting green environment as well as to accommodate stormwater from the Erven North of the Erf.

Access to the site is available from the existing Kanaal Road, which is to be upgraded and constructed for approximately 450m, to minimum 6m wide kerbed, paved road, from this development and to join up with the Modderdam road (D1208) to the west.

The existing entrance on the southern boundary will be moved westwards and be utilized as a service/emergency entry via the existing road over Portion 14 of the farm Vyfhoek 428 IQ and to join up with the Modderdam road (D1208) to the west.

Engineering Services

A Civil Engineering Report was compiled by Ferrokon Civil Engineering Services. *Refer to Appendix D(1) for the Civil Engineering Services Report.*

The findings of the Bulk Engineering Services indicated the following:

Water

Bulk raw water for the Greater Potchefstroom is abstracted from the Boskop/Potchefstroom Dam and purified at the Lakeside treatment works with a treatment capacity of almost 71mℓ/day and is currently undergoing an upgrade to 81 mℓ/day capacity. The treated water is pumped to the Vyfhoek, Ventersdorp and Eersterandjies distribution Reservoirs. Currently the average daily consumption varies between 60 and 66mℓ/day with 22% available capacity. Adequate bulk water, bulk water treatment and storage capacity is available. Water for the proposed development can be provided from the Vyfhoek Reservoirs via the 375mm main feeder.

Currently the water is supplied via the Municipal network with a 250mm uPVC pipe in Modderdam road reserve.

The 250mm Bulk line can be extended approximately 460m Eastwards in Kanaal avenue up to this development.

A household peak demand of 11.18 l/s is expected, and total maximum daily usage of 119 kl will be used.

Although domestic water pressure can be low, adequate capacity can be made available to supply in the daily demand of the proposed development.

Sewer

The capacity of the Bulk Sewerage Treatment Plant of Potchefstroom has been upgraded to accommodate future development. The treatment works with a treatment capacity of 45Mℓ/day are currently utilized at 33 – 34 Mℓ/day with 34% available capacity.

The Botha street Sewer Pumpstation is currently required to pump 73% of the sewer effluent of Potchefstroom to the treatment plant. The upgrade of the Pumpstations design is currently in the tender phase.

Currently the sewer service is available at an existing sewer line on the South Eastern side of BP X 35. This main sewer is currently being extended to accommodate the sewerage from BP X 54 as well as taking over 80% flow from the Thandi street sewer pump station.

The Bulk sewer line can be extended approximately 1170m to the Modderdam road reserve and then northwards past the Thandi street pumpstation (picking up the existing inflow from the eastern side – Saddlebrook) turning east in the service road up to the development.

This sewer line would be of adequate capacity to accommodate the intended development.

A household peak effluent out flow of 1.37 l/s is expected.

Roads

Access to the site is available from the existing Kanaal Road which is to be upgraded and constructed for approximately 450m, to minimum 6m wide kerbed, paved road, from this development and to join up with the Modderdam road (D1208) to the west.

The existing entrance on the southern boundary will be moved westwards and be utilized as a service/emergency entry via the existing road over Portion 14 of the farm Vyfhoek 428 IQ and to join up with the Modderdam road (D1208) to the west.

Modderdam road is linked to the N12 on the northern side and to the Parys road (R53) to the south east. The existing entrance to Modderdam road (D1208) can be upgraded to the standards of NW roads department and utilized.

Stormwater

The topography of the site has a natural fall towards the Southern side. The storm water collected on the property can be accommodated on surface and fed into a piped system. Most of the stormwater collected on the property will drain naturally towards the Loopspruit approximately 960m south and eventually end up in the Mooiriver. Wayleaves is to be obtained for a piped drainage system from the lower laying parties with the appropriate servitudes to be registered.

Solid Waste Management

Refuse removal is conducted by the J.B. Marks City Council. The dumping site is operated and maintained by the J.B. Marks City Council in assistance with the requirements of the Department of Water Affairs and Forestry. The additional refuse from the proposed development is minor in comparison to the existing refuse generated and can therefore be spoiled at the existing dumping site without difficulty.

Provision must be made for a dedicated closed off refuse area for cleaning and storage of bins.

The refuse can be collected and taken to the Municipal dumping site by a private refuse removal company as the J.B. Marks City Council don't have a refuse removal route available in this area.

A household and business refuse generation of 30.24m³ per week is expected.

Electrical Services

An Electrical Services Report was compiled by Denobili Consulting. *Refer to Appendix D(2).*

The site is within the electrical supply region of the JB Marks Local Municipality.

Maximum Demand

The estimated load required for the new township development is approximately 780kVA or 1,130A. The

following assumptions were made: A Floor Area Ratio (FAR) of 0.25 was used to calculate the business stand demand.

Energy Efficiency (EE) Demand estimation

Cost of energy is rising, and the world is becoming more aware of the environmental impact of our energy sources and footprint. Our National energy provider is under severe pressure and all measures should be taken to incorporate alternative energy sources. When energy efficiency measures are considered, the following guidelines are to be followed:

Regulatory standards:

- a) SANS 204 Energy Efficiency in Building &
- b) SANS 10400 Part X & XA Application of the National Building Act – Energy Usage.

Architectural point of design:

- a) Aluminium windows, larger northern openings to maximize solar radiation in winter and minimize it in summer;
- b) Smaller southern windows to prevent cold radiation in winter; &
- c) Correct orientation, north facing.

From an energy usage point of design:

- a) Equipment and appliances - Energy efficient electrical stoves or Gas stoves; high energy star rating appliances should be used
- b) Cooking – Gas should be considered in all households
- c) Water heating – By law, 50% of our water heating should be by means of alternative energy. Solar / Gas geysers or Heat pumps
- d) Energy efficient lighting such as LED's
- e) PV solar system and/ in combination with battery system will minimize grid supply

Proposed Bulk Supply

No electrical capacity is available at this stage to supply the proposed township development with power. The only option to the developer at this stage is to have a development totally off the electrical grid with Solar panels / Batteries and or Generators.

Traffic Impact Assessment

Ferrokon Civil Engineering Services was responsible for the compilation of a Traffic Impact Statement. *Refer to Appendix D(3)*. The traffic statement was prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

Conclusion

- It is expected that the proposed development will generate a total of 559 trips during the normal daily routine of which a rate of 123 vehicles per hour is expected during the 2.5hour peak duration. 306 trips fall in the AM and 305 trips fall in the PM weekday peak hours.
- The Estimated Environmental Capacity of new Kanaal road comes to 975 vp with a road width of > 6.0m at a design speed of 32 km/h.
- The impact of the 559 trips that is expected to be generated will have a considerable effect on the existing road network surrounding the proposed development.

- The upgrading of the Kanaal road to a 6m paved road with kerbing on both sides is essential to accommodate the traffic.
- It is expected that the bigger portion of the residents would travel northwards towards the CBD.
- The Traffic Peak would be spreaded over a 2.5 hour period.
- The access to the proposed development is located on new Kanaal road and should comply with the guidelines provided by the J.B.Marks Local Municipality.
- The intersection with Modderdam road is to be constructed to the specifications of the NW Roads department.
- The sight distance at the development access is at least 200m in a Northern direction.
- The closest intersection is Unnamed road, 300m (To proposed Entrance) to the North.

Recommendation

Bulk services to be extended as part of this development to accommodate further development in this area, in accordance with the SPLUMA master planning.

5 PROPERTY DESCRIPTION AND LOCALITY

The proposed project is located on Portion 1108 of the farm Vyfhoek 428 IQ, JB Marks Local Municipality, North West Province. The site is located to the eastern side of Potchefstroom, east of the Baillie Park residential neighbourhood and north of the Turfvlei Agricultural Holdings. The project is on the southern side of Kanaal avenue, approximately 400 m east of Modderdam road. Property co-ordinates: 26°42'31.30" South; 27°07'55.81" East.

The Surveyor-general reference numbers for the portion:T0IQ000000004280000.

The proposed project is set out in the Location Maps below.

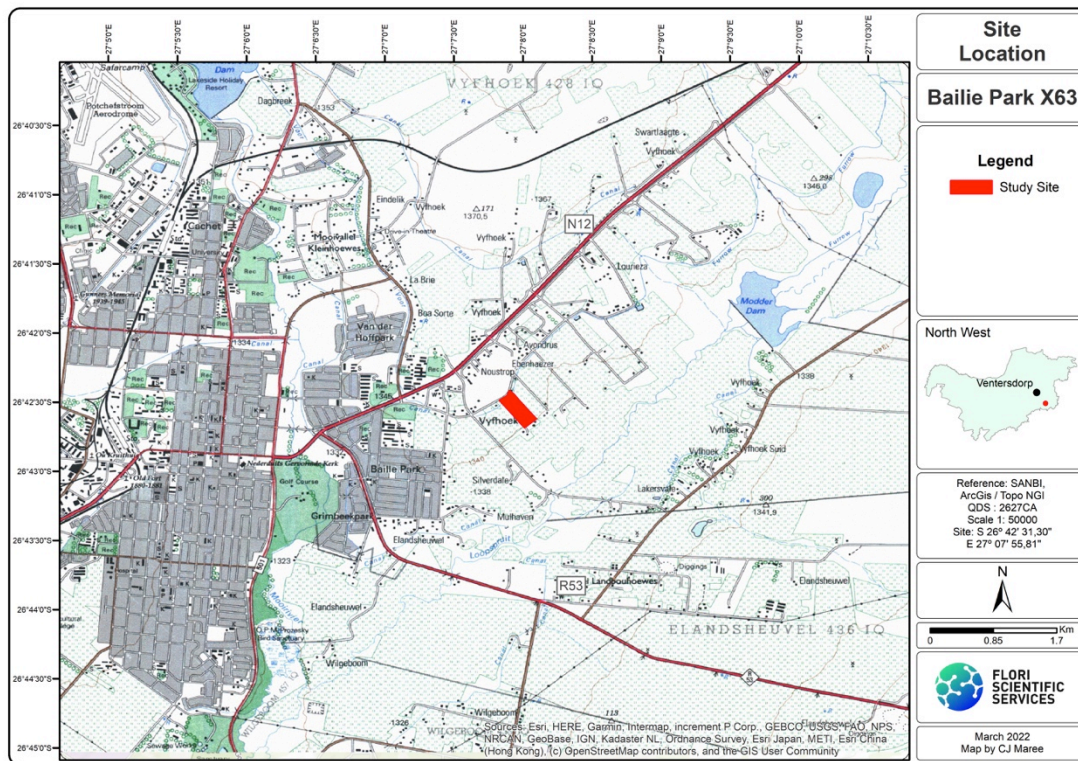


Figure 2: Site Location



Figure 3: Site Location (Google Earth)

The property is currently zoned “Agricultural”.

There are currently a dwelling house, several rental dwelling units, two swimming pools and outbuildings on the northern portion of the site. The remainder of the site is cultivated fields / lands that are either mowed or used for various farming activities typically found on smallholdings in the area. *Refer to photographs of the site below.*

Photographs of the site



Photo 1: Owner's residence



Photo 2: Guest house/lodge



Photo 3: View to the North



Photo 4: View to the North East



Photo 5: View to the East



Photo 6: View to the South East



Photo 7: View to the South



Photo 8: View to the South West



Photo 9: View to the West



Photo 10: View to the North West

6 LEGAL AND OTHER REQUIREMENTS

6.1 Applicable Legislation, Policies and/or Guidelines

The National Environmental Management Act (Act No. 107 of 1998) and the Environmental Impact Assessment (EIA) Regulations, of 2017

An application for authorisation of the project is submitted to the Department of Economic Development, Environment, Conservation and Tourism, North West Provincial Government (DEDECT), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations of 2017.

The proposed project is a listed activity in terms of Sections 24(2) and 24(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (as amended). The Environmental Impact Assessment (EIA) Regulations, 2017 promulgated in terms of Chapter 5 of the NEMA provide for the control of certain activities that are listed in Government Notice Regulation (GN R.) No. 327, 325 and 324. Activities listed in these notices must comply with the regulatory requirements listed in GN R. 326, which prohibits such activities until written Authorisation is obtained from the Competent Authority. Such Environmental Authorisation (EA), which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations of 2017. GN R. No. 326 sets out the procedure and documentation that need to be compiled with undertaking a Basic Assessment Process.

National Water Act (Act No. 36 of 1998)

The NWA provides for fundamental reformation of legislation relating to water resources and use. The preamble to the NWA recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. In terms of the NWA, the national government, acting through the Minister of the DEA, is the public trustee of South Africa's water resources, and must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The Minister of the DEA is responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values. The national government, acting through the Minister of the DEA, has the power to regulate the use, flow and control of all water in South Africa.

The most fundamental departure from the NWA is the removal of the concept of water as private property. Instead, water will be made available through user licences, which may be issued for a maximum period of forty years, subject to renewal. A priority of users has been established for the allocation of licences, with the environment near the top of the list of priorities.

Section 21 of the NWA indicates that “water use includes”:

- Taking water from a water resource;
- Storing water;
- Impeding or diverting the flow of water in a water course;
- Engaging in a stream flow reduction activity contemplated in section 36;
- Engaging in a controlled activity which has either been declared as such or is identified in section 37(1);
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- Disposing of waste in a manner which may detrimentally impact a water resource;
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Altering the bed, banks, course or characteristics of a water course;
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- Using water for recreational purposes.

Specified water uses, in section 21 of the NWA, must be licensed unless listed in Schedule 1; the continuation of an existing lawful water use; is permissible under a general authorisation issued under section 39 of the NWA, or if a responsible authority waives the need for a license.

No application required to be submitted to the Department of Water and Sanitation (DWS), for a water use authorisation in terms of the General Notice 509, Government Gazette 40229, dated 26 August 2016, “General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA)”.

The National Environmental Management Waste Act (No. 59 of 2008)

The National Environmental Management: Waste Act (No. 59 of 2008 (NEM:WA) serves to reform the law regulating waste management in order to protect human health and the environment. This is managed by providing reasonable measures for the prevention of pollution and ecological degradation. The NEM:WA aims to secure ecologically sustainable development while promoting justifiable economic and social development. The NEM:WA provides national norms and standards for regulating the management of waste by all spheres of government, for specific waste management measures and for matters incidental thereto. In terms of the NEM:WA the Minister of the DEA may publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Furthermore, the NEM:WA prohibits any person to commence, undertake or conduct a waste management activity except in accordance with the requirements or standards determined in terms of the NEM:WA for that activity or where a waste management licence (WML) has been issued in respect of that activity.

The Act, read together with the list of waste activities that have, or are likely to have, a detrimental effect on the environment (GN No. 921 of 29 November 2013) and the Amendments to the list of waste management activities that have, or are likely to have, a detrimental effect on the environment and

determination of commencement date for the National Norms and Standards for organic waste composting (GN No. 1757 of 11 February 2022) as well as the National Norms and Standards for organic waste composting published under Government Notice No. 561 in Government Gazette 44762 of 25 June 2021, have been considered for purposes of potential relevance.

The proposed activity will not trigger any listed activities in terms of NEM:WA.

The National Environmental Management Air Quality Act (No. 39 of 2004)

The National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA) allows for national, provincial and local air quality standards to be established as well as the declaration of priority areas. In addition the NEM:AQA requires that Air Quality Management Plans (AQMP) form part of the environmental implementation plan or environmental management plans to be prepared by national departments or the province as required by Chapter 3 of the NEMA. Furthermore the NEM: AQA requires municipalities to include an AQMP into its integrated development plan (IDP).

Key features of the NEM: AQA include:

- A decentralisation of air quality management responsibilities;
- The identification and quantification of significant emission sources that then need to be addressed;
- The development of ambient air quality targets as goals for driving emission reductions;
- The use of source-based (command-and-control) measures in addition to alternative measures, including market incentives and disincentives, voluntary programmes, and education and awareness;
- The promotion of cost-optimised mitigation and management measures;
- Air quality management planning by authorities, and emission reduction and management planning by sources; and
- Access to information and public consultation.

The overall objectives of the NEM:AQA include the following:

- The protection of the environment by providing reasonable measures for the protection of the quality of the air in the country;
- Protection of the environment by the prevention of air pollution and ecological degradation;
- Protecting the environment by securing ecologically sustainable development while promoting justifiable economic and social development; and
- To give effect to the constitution in order to enhance the quality of ambient air in order to secure an environment that is not harmful to the health and well-being of the people of South Africa.
- The NEM:AQA requires the Minister of the DEA to publish a list of activities which results in atmospheric emissions which may have a detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions, ecological conditions or cultural heritage. The NEM:AQA requires that an Atmospheric Emissions Licence (AEL) be obtained for such listed activities. Such a list of activities was published in GNR 248 (31 March 2010).

The proposed activity will not trigger any listed activities in terms of NEM:AQA.

National Heritage Resources Act (Act No. 25 of 1999)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) aims to protect heritage resources of national significance. The South African Heritage Resources Agency (SAHRA) was thus established in 1999 to fulfil the objectives of the NHRA. In terms of section 38 of the NHRA a heritage impact assessment (HIA) is required for any development or other activity which will change the character of the site:

- Exceeding 5 000m² in extent;
- Involving three or more existing erven or subdivisions thereof;
- Involving three or more erven or divisions thereof which have been consolidated within the past five years;
- The costs of which will exceed a sum set in terms of regulations by the SAHRA or a provincial heritage resource authority;
- The re-zoning of a site exceeding 10 000m² in extent;
- Any other category of development provided for in regulations by the SAHRA is a provincial heritage resource agency, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

The size of this site qualifies for a Heritage Impact Assessment (HIA). A Cultural Heritage Consultant was appointed to conduct a HIA. Refer to Appendix D(6) and Section 9.2.3.

National Forests Act (Act No. 84 of 1998)

The project might involve the cutting, disturbing, damaging or destroying of protected trees declared in terms of section 12 of the National Forest Act (NFA) (Act 84 of 1998), as amended.

No protected tree species are present on the study site.

6.2 National Environmental Management Act

In the South African legislative framework, the National Environmental Management Act No. 107 of 1998, as amended (NEMA) regulates development activities, which may pose a risk to the integrity of the ecological and human environment. Coupled with NEMA, listed activities are provided, which describe the types, limits, expanse and nature of developments that require a Basic Environmental Assessment Process, in application for Environmental Authorisation prior to commencement.

The following construction activities will require Environmental Authorisation:

The listed activities for the proposed project are the following:

Table 3: Listed Activities (to be confirmed)

Listed Activity	Activity/Project Description
GN R. 327/2017 <u>Listing Notice 1 Activity 27</u> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed development will require the clearance of approximately <u>9.1745</u> hectares of area including indigenous vegetation.

<p><u>GN R. 327/2017</u> <u>Listing Notice 1 Activity 28 (i)</u> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares.</p>	<p>The project entails the township development, to be known as Baillie Park Ext 63, on a total footprint of <u>9.1745 hectares</u> of Portion 1108 of the farm Vyfhoek 428 IQ.</p> <p>The property was previously used for <u>agricultural purposes</u> and falls <u>inside an urban area</u>.</p>
<p><u>GN R. 324/2017</u> <u>Listing Notice 3 Activity 4 (h)(iv)</u> The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p><u>h. North West</u></p> <p>iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p>	<p>To allow for the construction of roads and access roads wider than 4m within an aquatic CBA.</p> <p><i>According to the Screening Report for Environmental Authorization as required by the 2014 EIA Regulations the study area falls within an Aquatic CBA. However, according to the North West Province's Biodiversity Sector Plan (2015) the study area does not fall within a CBA but falls within an Aquatic ESA.</i></p>
<p><u>GN R. 324/2017</u> <u>Listing Notice 3 Activity 12 (h) (iv)</u> The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p><u>h. North West</u></p> <p>iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority</p>	<p>The proposed development will require the clearance of approximately <u>9.1745</u> hectares of area including indigenous vegetation within an aquatic CBA.</p> <p><i>According to the Screening Report for Environmental Authorization as required by the 2014 EIA Regulations the study area falls within an Aquatic CBA. However, according to the North West Province's Biodiversity Sector Plan (2015) the study area does not fall within a CBA but falls within an Aquatic ESA.</i></p>

7 NEED AND DESIRABILITY¹

7.1 Need

- The necessity for the provision of residential stands developments are driven by the continuous positive population growth of Potchefstroom, which is indicated in the growth projections included in the Tlokwe SDF, 2014. It is projected in this framework that in 2023 the growth in Potchefstroom will have significantly increased. The proposed new township as well as the other surrounding new and proposed townships will contribute to the provision of residential accommodation for the growing residential market needs.
- New and existing townships are in process in this specific area which indicates the popularity of this location as well. Also important to note, is that the growing residential market and supply in this need, will stimulate economic growth. Any development and or investment in

¹ Information obtained from Township Establishment Application by Welwyn Town and Regional Planners

the area will also lead to upgrading of the area and stimulate more development and thus more investment.

- The proposed development will be similar as the well-known De Land lifestyle estate just on a smaller scale. It will mainly cater for the elderly and their families, seeing that provision is made for care facilities, guest facilities and community facilities. This unique development will thus ideally for people who want to stay near their parents but not in the same house or erf.
- The proposed development will promote job opportunities, ensure services for the erven, promoting diverse supply of land uses for Potchefstroom and utilized land which is not earmarked as unique agricultural land but has been earmarked as land for potential development within the urban edge.
- The land uses will also continue to contribute and stimulate more private investment in and around Potchefstroom which is beneficial to the growth of the local economy.
- The utilization of existing agricultural properties in between existing townships is beneficial as it serves as infill development. It also increases compact development which then demotes urban sprawl and which is promoted by the Tlokwe Spatial Development Framework. It also increases integration with the existing and planned township areas by means of infill development.
- The land uses are also in line with the planning for the area as set out in the Tlokwe SDF, 2015. The area is earmarked for residential development and is situated adjacent the planned road network for the surrounding area. Thus the planning of the township is in line with the local authority's planning for the area.
- The local authority will provide the bulk services (water, sewerage, solid waste disposal and storm water). The Council will benefit financially from the development due to higher property tax, bulk service contribution and increased utilization of services.

7.2 Desirability

- Location: The property is situated adjacent Kanaal and a no name Street on the Southern boundary, to the east of Potchefstroom. Existing townships surround this property with a few small farms/holdings to the south and north – all of which is mostly used for residential purposes. The locality of the property is fitting with regards to the existing and planned residential developments/extensions in the surrounding area. The township also has higher accessibility and increased movement due to the locality to the existing and planned road network.
- The property is currently only utilised for residential purposes. The proposed township will ensure increased utilization of under-utilized land in between existing developments and will formally upgrade the property with the proposed township establishment.
- This area East of the Modderdam Road are mainly small holdings that are earmarked for future development, this Township will be the trigger for future developments in this area.
- Traffic will be generated and bulk services will be connected and utilized efficiently. The property, after completion of the township establishment process, will be developed in full. Visually, the township will provide modern and high aesthetical quality developments.
- The character of the area is predominantly residential small holdings. To the West mainly medium to higher density developments are found. The addition of this medium density township will start or trigger future developments in this area.
- The township is also a direct reaction to the positive and continuous market growth experience in Potchefstroom. As similar developments are already found in the

surrounding area and is continuously growing, it proves not only the demand for the proposed township but also the ideal location thereof users.

- The utilization of existing properties within the urban edge, contributes to the limiting of urban sprawl. Using the existing property in between existing developments is seen as infill development which promotes urban integration by providing more residential options in a central location. Compact development, densification, optimal utilization of land and cost-effective development are all factors which contribute to a positive spatial development direction and thus this application can be seen as supporting these principals.
- The proposed township will provide the opportunity for a significant and meaningful development on the property which, with regards to the land costs, will be an economically feasible project.

8 ALTERNATIVES

8.1 Introduction

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- the property on which or location where it is proposed to take place;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

The following alternatives were investigated:

a) Site alternatives

Site Alternatives	Description
Alternative Site 1 (only alternative)	Portion 1108 of the farm Vyfhoek 428 IQ, JB Marks Local Municipality, North West Province
Alternative Site 2	No site alternatives were considered as this is the only site available to the applicant

b) Activity alternatives

Activity Alternatives	Description
Alternative 1 (preferred alternative)	Establishment of a residential development, including a school facility, business erven, private open space and associated infrastructure, on Portion 1108 of the farm Vyfhoek 428 IQ, North West Province.
Alternative 2	Establishment of a residential development, including a school facility, business erven, private open space and associated infrastructure, was regarded as the preferred activity due to the need and desirability of the proposed development. No activity alternatives were considered.

c) Layout alternatives

Layout Alternatives	Description																																								
<p>Alternative 1 (preferred alternative)</p>	<p>Layout makes provision for the following land uses:</p> <table border="1" data-bbox="587 416 1278 712"> <thead> <tr> <th>LAND USE</th> <th>NUMBER</th> <th>ERF NO.</th> <th>AREA</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Residential 1</td> <td>45</td> <td>1-45</td> <td>4,6428 Ha</td> <td>50.61</td> </tr> <tr> <td>Institutional (Use for School Facility)</td> <td>1</td> <td>49</td> <td>0,1021Ha</td> <td>1.11</td> </tr> <tr> <td>Business 3 (With Annexure)</td> <td>3</td> <td>46-48</td> <td>2,2828 Ha</td> <td>24.88</td> </tr> <tr> <td>Private Open Space</td> <td>1</td> <td>50</td> <td>0,3387 Ha</td> <td>3.69</td> </tr> <tr> <td>Private Road</td> <td>1</td> <td>51</td> <td>1,4961 Ha</td> <td>16.31</td> </tr> <tr> <td>Public Roads</td> <td></td> <td></td> <td>0,5136 Ha</td> <td>3.40</td> </tr> <tr> <td>TOTAL</td> <td>51</td> <td></td> <td>9,1745 Ha</td> <td>100.00</td> </tr> </tbody> </table> <p>Access to the site is available from the existing Kanaal Road (to be upgraded). The existing entrance on the southern boundary will be moved westwards and be utilized as a service/emergency entry.</p> <p>A Private Open Space Area (0,3387 ha) in the centre of the residential area.</p>	LAND USE	NUMBER	ERF NO.	AREA	%	Residential 1	45	1-45	4,6428 Ha	50.61	Institutional (Use for School Facility)	1	49	0,1021Ha	1.11	Business 3 (With Annexure)	3	46-48	2,2828 Ha	24.88	Private Open Space	1	50	0,3387 Ha	3.69	Private Road	1	51	1,4961 Ha	16.31	Public Roads			0,5136 Ha	3.40	TOTAL	51		9,1745 Ha	100.00
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TOTAL	51		9,1745 Ha	100.00																																					
<p>Alternative 2</p>	<p>Layout makes provision for the following land uses:</p> <table border="1" data-bbox="587 1070 1289 1366"> <thead> <tr> <th>LAND USE</th> <th>NUMBER</th> <th>ERF NO.</th> <th>AREA</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Residential 1</td> <td>47</td> <td>1-47</td> <td>4,4910 Ha</td> <td>48.95</td> </tr> <tr> <td>Institutional (Use for School Facility)</td> <td>1</td> <td>51</td> <td>0,0865Ha</td> <td>0.94</td> </tr> <tr> <td>Business 3 (With Annexure)</td> <td>3</td> <td>48-50</td> <td>2,3058 Ha</td> <td>25.13</td> </tr> <tr> <td>Private Open Space</td> <td>1</td> <td>52</td> <td>0,0666 Ha</td> <td>0.73</td> </tr> <tr> <td>Private Road</td> <td>1</td> <td>53</td> <td>1,9096 Ha</td> <td>20.81</td> </tr> <tr> <td>Public Roads</td> <td></td> <td></td> <td>0,3053 Ha</td> <td>3.44</td> </tr> <tr> <td>TOTAL</td> <td>53</td> <td></td> <td>9,1745 Ha</td> <td>100.00</td> </tr> </tbody> </table> <p>Access to the site is available from the existing Kanaal Road (to be upgraded) and the road on the southern border (to be upgraded).</p> <p>A Private Open Space Area (0,0666 ha) in the northern section of the residential area.</p>	LAND USE	NUMBER	ERF NO.	AREA	%	Residential 1	47	1-47	4,4910 Ha	48.95	Institutional (Use for School Facility)	1	51	0,0865Ha	0.94	Business 3 (With Annexure)	3	48-50	2,3058 Ha	25.13	Private Open Space	1	52	0,0666 Ha	0.73	Private Road	1	53	1,9096 Ha	20.81	Public Roads			0,3053 Ha	3.44	TOTAL	53		9,1745 Ha	100.00
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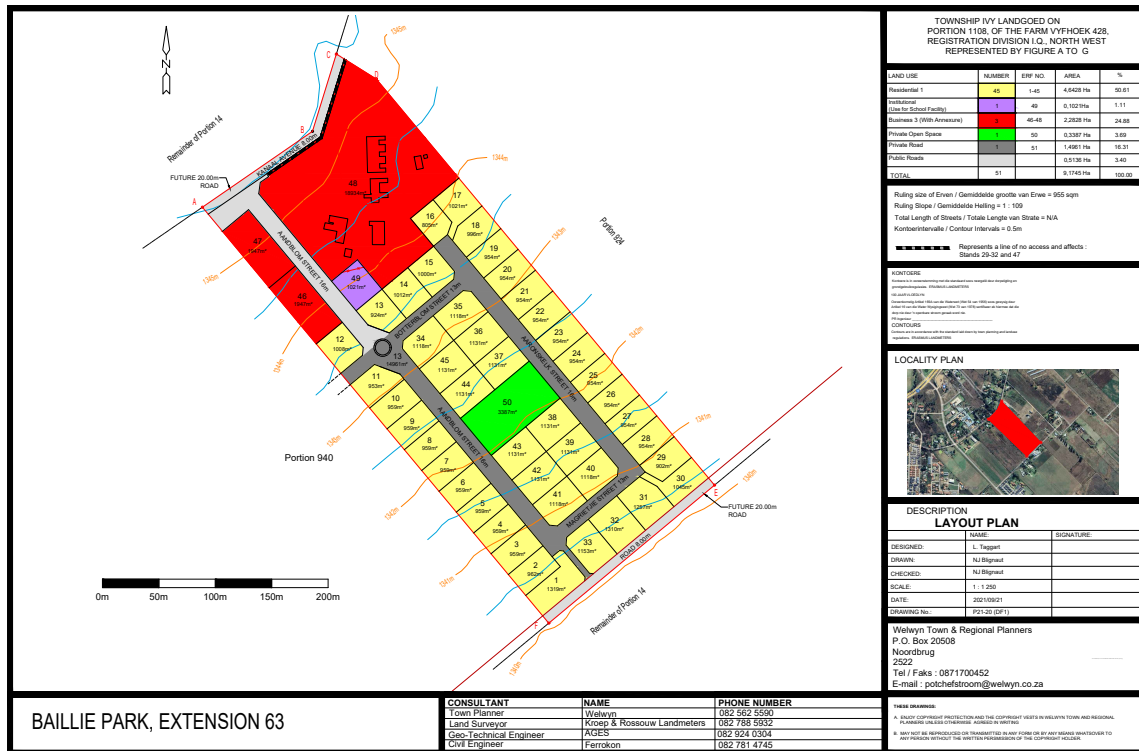


Figure 4: Layout Alternative 1 (Proposal)

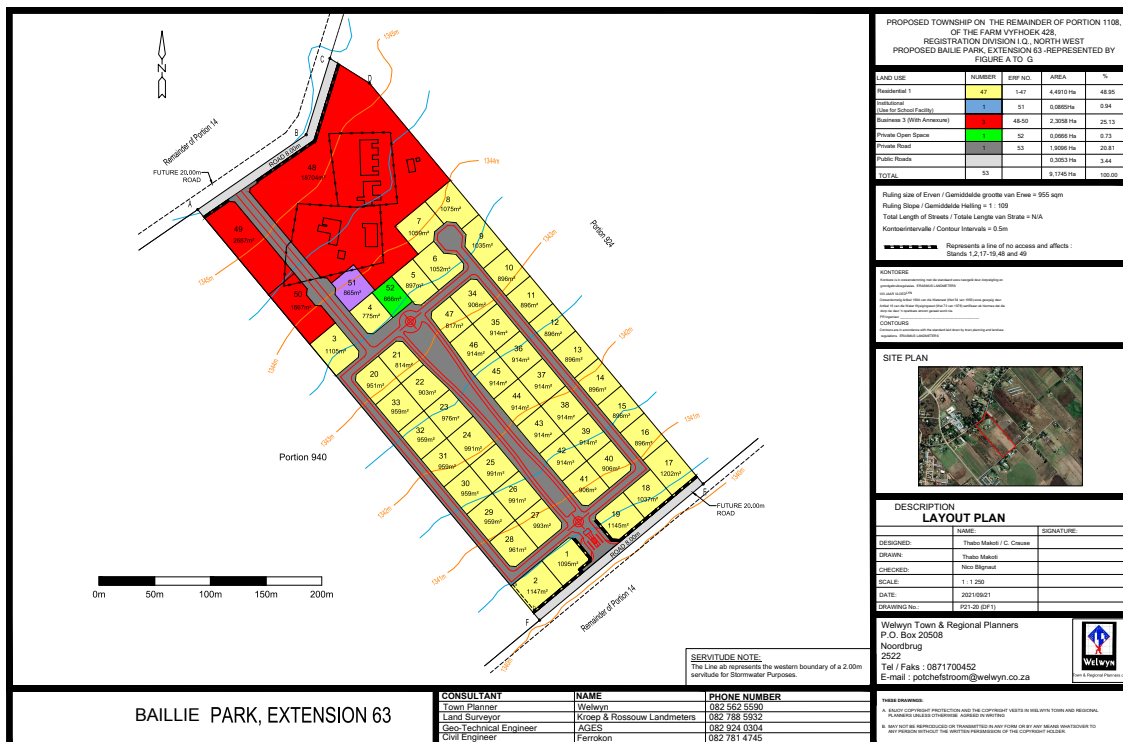


Figure 5: Layout Alternative 2

d) No-Go alternative

Should this option be implemented, the “status quo” will prevail and none of the advantages listed associated with the proposed development will realize.

8.2 Motivation for the preferred alternatives

Layout Alternative (1) Proposal

Access to the site is available from the existing Kanaal Road which is to be upgraded and constructed for approximately 450m, to minimum 6m wide kerbed, paved road, from this development and to join up with the Modderdam road (D1208) to the west.

The existing entrance on the southern boundary will be moved westwards (*please refer to Layout Alternative 2*) and be utilized as a service/emergency entry via the existing road over Portion 14 of the farm Vyfhoek 428 IQ and to join up with the Modderdam road (D1208) to the west. Only limited traffic will occur on this road thereby mitigating the traffic impact on properties situated to the south of the proposed development.

Layout Alternative 1 provides a much larger Private Open Space Area (0,3387 ha) in the centre of the residential area in comparison with the Private Open Space Area of only 0,0666ha in the northern section of the residential area in Layout Alternative 2.

Layout Alternative 1 is regarded as the preferred alternative.

Layout Alternative 2

Access to the site is available from the existing Kanaal Road (to be upgraded) and the road on the southern border (to be upgraded).

The entrance in Kanaal Road will serve for the workers, guesthouse/care facilities and other community facilities such as the Pre-School, Restaurant and Social Hall that will be established on the Business and Institutional erven. The Southern Entrance will be the main entrance for the permanent residents living in the estate on erven 1- 45. The traffic generated by this entrance will have a significant impact on the residents to the south of the site and would require the upgrading of this road which would have an impact on surrounding residents.

In addition, Layout Alternative 2 provides a much smaller Private Open Space Area than Layout Alternative 1.

Layout Alternative 2 is not regarded as feasible and therefore it is recommended that Layout Alternative 1 be implemented.

Alternative 3: No-Go alternative

The no-go alternative will entail that the status quo will remain.

None of the advantages associated with the proposed residential development will realize should the no-go option be implemented. The no-go option is therefore not regarded as a viable alternative.

9 DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROPOSED DEVELOPMENT

9.1 BIO-PHYSICAL

9.1.1 Geology and Soils

A Phase 1 Geotechnical Assessment was done by AGES in October 2021. *Refer to Appendix D(4).*

Results of the Geotechnical Assessment:

The following regional geological information is considered of importance:

- According to the published geological map, the study area is covered by a significant thickness of *alluvial deposits* associated with periodic flood events along the Loopspruit River, inferred underlain by *shale* of the **Silverton Formation** of the Pretoria Group, Transvaal Supergroup exhibiting an east-southeastwardly strike direction and shallow dip angle inferred towards the south-southwest.
- The area is not underlain by water-soluble strata as defined by SANS 1936 (2012), and as such is **not classified as dolomite land**.
- No sources of natural materials of economic importance are indicated to occur in the vicinity of the site.
- The available information does not indicate any current or past mining activity in the direct vicinity of the stand, which is as such not deemed affected by undermining.
- No prominent geological structures (e.g., faults or dyke intrusions), along which displacement and/or alteration of strata could have occurred, are indicated to cut through the area in which the site is located.

The following can be inferred in terms of natural and man-induced seismicity according to SANS 10160:4 (2009), with:

- the presence of bedrock at a depth of less than 5 m classifies the overburden as Ground Type 1,
- the site falls in Seismic Zone II (potentially at risk of both natural and mining-induced seismic events), and
- the proposed residential structures classify as Building Importance Class II ordinary buildings, while the educational facility classifies as Class III buildings for which seismic resistance is of importance in view of consequences associated with collapse.

Summarized material characteristics

In the light of the laboratory test results, as well as visual observations made during the field phase of the investigation, the various soil-like layers are expected to exhibit the following adverse geotechnical characteristics:

- The residual shale layer is considered slightly compressible, mainly due to a semi-consolidated nature offset by a considerable variation in its constituent particle sizes that allows densification thereof under loading (especially when saturated). This material is expected to occur mainly

within the inferred sphere of influence below founding depth, and as such could have an effect on the long-term stability of the proposed residential structures.

- Guidelines by Watermeyer and Tromp (1992) indicate that the total calculated settlement beneath foundations for a slightly compressible soil will be in the order of between 20 and 25 mm for modal profile Westleigh1, and between 7.5 and 25 mm for modal profile Westleigh2.
- As the fines fraction of all samples exhibits moderately high to high (i.e., LL-values in excess of 30%, PI-values in excess of 12, and LS- values in places in excess of 8.0%), albeit with a clay content significantly less than 12% and the absence of at least moderate in-situ soil structure observed along trench sidewalls (Netterberg, 2019), it is inferred that the soil-like overburden and underlying weathered shale bedrock is potentially only slightly expansive. Utilizing the Van der Merwe (1980) equation conservatively, it is estimated that the maximum heave exhibited by the soil-like overburden will be in the order of between 5 and 7.5 mm for modal profile Westleigh1, and between 1.5 and 7.5 mm for modal profile Westleigh2.
- In the light of the measured high EC values and moderately to strongly alkaline pH-values, the soil-like overburden is considered potentially highly corrosive to steel.
- The relatively plastic residual shale was found to react only moderately well to compaction, with the samples yielding relatively low maximum density values and high optimum moisture content with corresponding moderate CBR values even when compacted at 100% MOD AASHTO density. This is corroborated by calculated Compatibility Factor values greatly in excess of 0.4 deemed indicative of poor compatibility.
- Although the alluvial topsoil exhibits calculated bearing strength values of less than the minimum value ideally required for a single-storey residential structure (i.e., 50 kPa) and low-volume roads, the residual shale occurring from between 0.2 and 0.5 m is considered sufficient for the proposed development.

Slope stability and erosion

- The average slope of the site is generally less than 0.5° (nearly level terrain), with only localized portions exhibiting slopes of up to 6°. As such, instability of the natural slopes is not expected.
- Significant surface erosion was not observed in the area. Additionally, the relatively gentle slope of the area indicates a low risk of surface erosion.
- No evidence of potentially dispersive material (e.g., a weakly to strongly developed prismatic soil structure) was observed.

Excavation classification with respect to services

Excavation of roadworks, shallow service trenches, and foundation trenches into the natural soil-like overburden generally classifies as “better than soft” excavation class to a depth of between at least between 0.6 and 1.6 m, allowing excavation by hand or TLB-type light mechanical excavator.

However, the highly weathered shale bedrock classifies as “soft” excavation class, requiring at least a light mechanical excavator to remove, while the moderately hard shale bedrock occurring from between 1.1 and 2.1 m classifies as “intermediate” excavation class, the removal of which will require a tracked excavator or power tools.

Other adverse characteristics

The site is located in Seismicity Zone II, and as such could be at risk of natural and mining-induced seismic events.

SITE CLASS DESIGNATIONS

Refer to Figure 6: Geotechnical Zonation Map.

The geotechnical character of the study area is predominantly determined by that of the soil-like overburden, in particular that of the weakly ferruginized residual shale. Although the study area exhibits geotechnical characteristics deemed to have an adverse effect on the construction of the proposed residential structure, these characteristics do not disqualify the site from being used for residential development, but rather require the strict implementation of site-specific precautionary measures with regard to design and construction of the proposed structures. These include:

- the presence of potentially compressible material beneath the foundations that could cause localized differential settlement under loading or when saturated, especially in the period after construction until a state of equilibrium has been achieved,
- the presence of potentially expansive material beneath the foundations that could lead to severe structural damage over time as a result of ongoing seasonal heave and shrinkage associated with changes in soil moisture content,
- the presence of weathered bedrock exhibiting moderately hard rock consistency from a depth of between 1.1 and 2.1 m that could adversely affect the installation of buried services in localized portions of the study area.
- the inferred formation of a weak seasonal perched groundwater table within the soil-like overburden that could cause structural degradation over time as a result of rising damp, and
- moderately highly localized portion along the eastern boundary of the site, as well as in the extreme north of the property, that exhibit slopes of between 4.5 and 6° that will require additional work during construction.
- The absence of dolomitic strata in and in the immediate vicinity of the stand classifies the whole stand as non-dolomite land, and as such site-specific dolomite risk management and/or mitigation measures in this regard will not be required.

It is inferred that the foundations of mainly single-storey residential structures and that for the proposed educational facility will be placed within or on the weakly ferruginized residual shale. The effects of loading will generally be accommodated within that material, but occasionally extending onto weathered bedrock occurring at a depth of less than 1.2 m.

It must be noted that subtle differences in geotechnical character between the two modal profiles are not sufficient to warrant classification thereof into separate geotechnical zones. However, the development potential of those portions of the study area exhibiting steeper slopes differ slightly from the remainder. In this light, the various geotechnical characteristics revealed by this investigation define the following geotechnical zones:

Suitable for development, with precautions:

Zone A1:

- represented by modal profiles *Westleigh1* and *Westleigh2* in areas with slopes of less than 4.5°.
- the area covered by this zone is considered suitable for residential development, but requires the implementation of precautionary and/or mitigation measures to counter the effects of various adverse geotechnical characteristics as detailed above.
- classifies as NHBRC Site Class S1/S2 - H/H1 - (R) - (pseepage).

Zone A2:

- represented by modal profiles *Westleigh1* and *Westleigh2* in areas with slopes of between 4.5 and 6°.
- the area covered by this zone is considered suitable for residential development, but requires the implementation of precautionary and/or mitigation measures to counter the effects of various adverse geotechnical characteristics as detailed above.
- classifies as NHBRC Site Class S1/S2 - H/H1 - (R) - (pseepage).



Figure 9: Geotechnical zonation map.

Figure 6: Geotechnical Zonation

Foundation recommendations and solutions

Recommendations regarding the design and construction of proposed residential structures within the study area are provided as follows:

- Zones A1 and A2:
 - Option 1: Stiffened strip footings
 - Option 2: Stiffened or cellular raft
 - Option 3: Soil raft

NOTE: Details regarding each founding option are provided in Appendix A of Geotechnical Report.

The seasonal occurrence of a weak perched water table at a depth of less than between 0.6 and 1.6 m requires incorporation of suitable damp-proofing measures within the foundations and beneath floor slabs and road surfaces to protect against the effects of rising damp. However, the implementation of a sub-surface drain beneath the structures is not required.

Foundation construction in areas exhibiting slopes of between 4.5 and 6° (i.e., Zone A2) will require terracing through the addition of extra masonry units in foundation walls.

The inferred high corrosivity of the natural soil with regard to steel (e.g., rebar) should be considered during construction.

Drainage

The generally nearly level topography indicates that large portions of Zone A1 are prone to ponding of surface water, especially after heavy precipitation events. In this light, proper site drainage that includes the removal of water runoff from roofs is essential to prevent seasonal ponding of surface water and large-scale changes in soil moisture beneath and near structures. Additionally, the angles of stormwater and sewer pipelines will have to be artificially enhanced to allow proper functioning thereof.

Those areas with moderate slopes, classified as Zone A2, will require with additional earthworks along access roads and the implementation of stormwater control measures to prevent scouring of unpaved areas where surface runoff could collect.

Special precautionary measures

The clayey soil-like materials that will be removed during construction could be suitable for re-use in compacted engineered fills beneath roads and foundations, provided excessively coarse particles, as well as the relatively plastic fines fraction, are removed. It must be noted that the natural materials generally occurring from a depth of between 0.2 and 0.5 m classify as SC-type material according to the USCS standards, and exhibit in-situ strength considered marginally sufficient for the construction of a low volume access road. Proper preparation and layering work will, however, be necessary.

The following additional generalized recommendations typically apply:

- Excavated material was backfilled in bulk with the TLB, and as such not re-compacted as required for engineered layer works. As such, it should be noted that if structures are considered to be positioned across or over excavated test pits, the material must be properly compacted in order to prevent the occurrence of differential settlement.
- This also applies for structures positioned across or over existing septic tanks (where present), where excavations for the removal of large trees took place, waste pits, swimming pools, old foundations, etc.
- Trenches may have to be dewatered after heavy precipitation events.
- The sidewalls of excavations in excess of 1.0 m should be shored to prevent injury or death due to the risk and probability of sidewall failure by collapse and/or overbreak.
- It is recommended that the development be connected to a conventional municipal bulk sewerage removal system for off-site treatment of liquid waste. On-site sanitation systems that rely on seepage for the disposal of liquid wastes (e.g., a septic tank that drain into a “French Drain”-type soak-away) should not be utilized. Alternatively, use can be made of a sealed conservancy system that requires regular servicing.
- Wet services (i.e., water supply pipes and sewers) must be designed and maintained to prevent leaks and blockages, and proper backfilling should be enforced to reduce storm water inflow.

- Water-loving plants and trees should preferably not be placed within 1.5 m of any structure or wet services. Gardening directly next to structures should be discouraged.

Conclusions

The results of this detailed (NHBC Phase 1) geotechnical site investigation revealed the following:

- the soil-like overburden underlying the proposed development exhibits a fairly homogenous geotechnical character, with sub-surface conditions dominated by the presence of a significant thickness of slightly to moderately compressible, and slightly expansive soil-like overburden,
- a seasonal weak perched groundwater level is expected to occur at relatively shallow depth within the soil-like overburden, and could persist for a significant period after the rainy season,
- occasional pockets where weathered bedrock occurs relatively close to the surface that could hamper excavation of service trenches by hand or light mechanical excavator,
- highly localized areas exhibiting slopes of between 4.5 and 6°,
- the fairly homogenous geotechnical characteristics of the soil-like overburden allow classification of the whole stand as NHBC Site Class S1/S2-H/H1-(R)-(p^{seepage}),
- the soil-like overburden is expected to be corrosive to steel.

Recommendations

It is recommended that a services-level geotechnical investigation (corresponding to a NHBC Phase II investigation) be conducted during placement of bulk services within the proposed township in order to identify and assess localized sub-surface conditions at variance with that encountered during this investigation.

It is further recommended that a geo-professional inspect foundation and service trenches to identify and address sub-surface conditions at variance with that encountered during this investigation.

Additionally, site-specific geotechnical investigations should be conducted.

9.1.2 Topography

The results of a regional slope analysis indicate:

- mainly, nearly level terrain (less than 0.5°),
- very gentle slopes (between 0.5 and 2°) in the northwest, southeast and east of central portion,
- localized areas exhibiting gentle slopes (between 2 and 4.5°) occur in the extreme north, as well as east of the central portion, and
- moderate slopes (between 4.5 and 6°) occur in the extreme north, and along the north-eastern boundary of the site.

9.1.3 Climate

The area is located within the summer rainfall area. The average annual rainfall is estimated at 625mm. Weinert's N-value is calculated at 5 indicating chemical decomposition is the predominant form of the weathering process (Weinert, 1980).

9.1.4 Biodiversity

Refer to *Biodiversity Impact Assessment Report (Appendix D(5))*.

Vegetation

The study area is situated within the Grassland Biome of South Africa, which is characterised by a dominant lower layer of grasses and sparse to absent middle-layer and upper-layer of shrubs and trees (except on rocky outcrops and ridges, which are typically protected from annual veldfires). The site is within the Mesic Highveld Grassland Bioregion, which incorporates the wetter (mesic) highveld grasslands of the Grassland Biome.

The study site is within the original extent of **Rand Highveld Grassland**, which is a threatened ecosystem / veldtype with a status of 'Vulnerable' (Skowno, 2019).

Rand Highveld Grassland is characterised by a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. Most common grasses on the plains belong to the genera *Themeda*, *Eragrostis*, *Heteropogon* and *Elionurus*. High diversity of herbs, many of which belong to the Asteraceae, is also a typical feature. Rocky hills and ridges carry sparse (savannoid) woodlands with *Protea caffra*, *Protea welwitschii*, *Vachellia (Acacia) caffra* and *Celtis africana*, accompanied by a rich suite of shrubs among which the genus *Searsia* (especially *Searsia magalismonata*) is most prominent (Mucina & Rutherford, 2010).

Vegetation of the site

The study site is situated within the original extent of Rand Highveld Grassland. However, the vegetation on the site has been transformed and altered due to years of ploughing, cultivating, harvesting and regular mowing of open cultivated and farmland fields during periods when they were dormant. These decades of farming activities and other activities on the smallholding property (study site) have resulted in only a few common locally indigenous pioneer grasses emerging and growing during times when the fields were left fallow. The vegetation of the study site cannot be considered that of Rand Highveld Grassland, and is not characteristic of the veldtype / ecosystem. Furthermore, there is a total lack of species richness of forbs, shrubs etc. associated with normal or good Rand Highveld Grassland, or natural / original grassland. There are also no areas of pristine, or even fair condition, highveld grassland present on the study site.

Species observed during site investigations included: *Cynodon dactylon*, *Digitaria monodactyla*, *Heteropogon contortus*, *Setaria sphacelata*, *Themeda triandra*, *Eragrostis curvula*, *Hyparrhenia hirta*. Alien plant species found on site included: *Argemone ochroleuca*, *Bidens pilosa*, *Conyza canadensis*, *Tagetes minuta*, and *Verbena bonariensis*.

Priority Floral Species

No priority species or floral species of conservation concern (SCC) were observed during site investigations, including red data listed (RDL) and orange data listed (ODL) species.

Protected tree species identified in the study area

No national or provincial protected tree species are present on the study site.

Fauna

Field observations were limited to a few days, which always limits the observation and identification of fauna in the field. Due to the transformed nature of the study site, urban area to the west and cultivated lands to the east the faunal species richness will be low. Ideal habitats for most large or priority faunal species (SCC) are very low to non-existent, with the best habitat just south of the study site at the Loopspruit. Nearby, open actively cultivated farmlands have very limited ideal habitats for the permanent presence of faunal species in terms of feeding, sleeping and breeding. It is evident that some common, typically small species will traverse the general area from time to time.

Mammals

No large- or medium-sized mammals were observed during field investigations. Small mammals, mostly rodents, are present in the general area and study site, including common small field mice and other rodents such as rock mouse (*Aethomys namaquensis*), striped mouse (*Rhabdomys pumilio*), multimate mouse (*Mastomus natalensis*) and bushveld gerbil (*Tatera leucogaster*). Evidence was also found of scrub hare (*Lepus sacatilis*) and possibly yellow mongoose (*Cynictis penicillata*). The study site is within the distribution range of slender mongoose (*Galerella sanguinea*), however they require adequate cover, which is lacking in the area and therefore will be scarce, if present.

The endangered Oribi (*Ourebia ourebi ourebi*) is a small antelope (buck) that lives in open moist grassland. The antelope prefers short grassland with patches of tall grass in which to hide. They avoid steep slopes. The study site is within the original distribution of the species but it is highly unlikely that there are any present in the immediate area.

Avifauna

The study site is not within an Important Bird Area (IBA) and there are no IBAs within a 100km radius of the study site. A number of common bird species are present in the area, but species of conservation concern (SCC) / priority species are scarce to absent. There are also no ideal habitats on the study site for the permanent nesting and breeding of most avifauna SCC.

Reptiles

The study area is not within any snake hotspot or a lizard hotspot. Lizards tend to prefer rocky habitats and there are no rocky outcrops (koppies), rocky ridges or areas of large rock sheets within the study area. The likelihood is rare that any priority snake species or lizard species will be present in the study area.

Due to the openness of agricultural holdings and the nearby stream a number of common snake species can be expected.

Invertebrates

Invertebrates such as spiders, scorpions and butterflies are important faunal groups, but are difficult to fully assess in a short time period. During field investigations specific attention was given to priority species such as Mygalomorphae arachnids (Trapdoor and Baboon spiders) and red data butterflies.

Recorded butterfly fauna falls into: 5 families, 16 subfamilies, 84 genera, 191 species and 2 subspecies (193 taxa). Shared endemic genera: 1. Exclusively endemic species or subspecies: none. Shared endemism: 12 species and 3 subspecies (14 taxa).

Proposed Red List taxa: 4, namely:

Lepidochrysops hypopolia (Status – Extinct), *Lepidochrysops praeterita* (Status – Endangered), *Metisella meninx* (Status - Vulnerable), and *Platylesches dolomitica* (Status - Vulnerable).

Three of the priority species are found in the general region of the study site, namely, *Lepidochrysops hypopolia*, *Lepidochrysops praeterita*, and *Metisella meninx*. Potchefstroom is a known butterfly hotspot for these three species. However, *Lepidochrysops hypopolia* is thought to be extinct in the wild.

The study area is not within any butterfly hotspot.

Faunal species of conservation concern

Most of the habitats present in the study area and surrounding areas are not pristine and are not ideal for most potentially occurring Red Data Listed (RDL) or SCC faunal species. Care should still be taken to avoid impacting on or interacting with, any wild animals encountered.

Aquatic Ecology

Watercourses

There are no watercourses in the study site. This includes perennial rivers, seasonal streams, seasonal drainage lines and wetlands. There are also no pans or depression wetlands found on the property (study site). The closest river is the Loopspruit (Loop Stream), which about 930 m southeast outer boundary of the study site. The Loopspruit flows in a southwesterly direction and into the Mooi River.

The study site is very flat with a slight downward gradient towards the Loopspruit, so during periods of heavy rainfall there is surface stormwater run-off across the site. This leads to some areas of prolonged wetness on the site, but this is seen as normal stormwater run-off and is not a drainage line nor a wetland area. The latest national wetland map (Map 5, 2018) supports the findings that there are no wetlands on the study site.

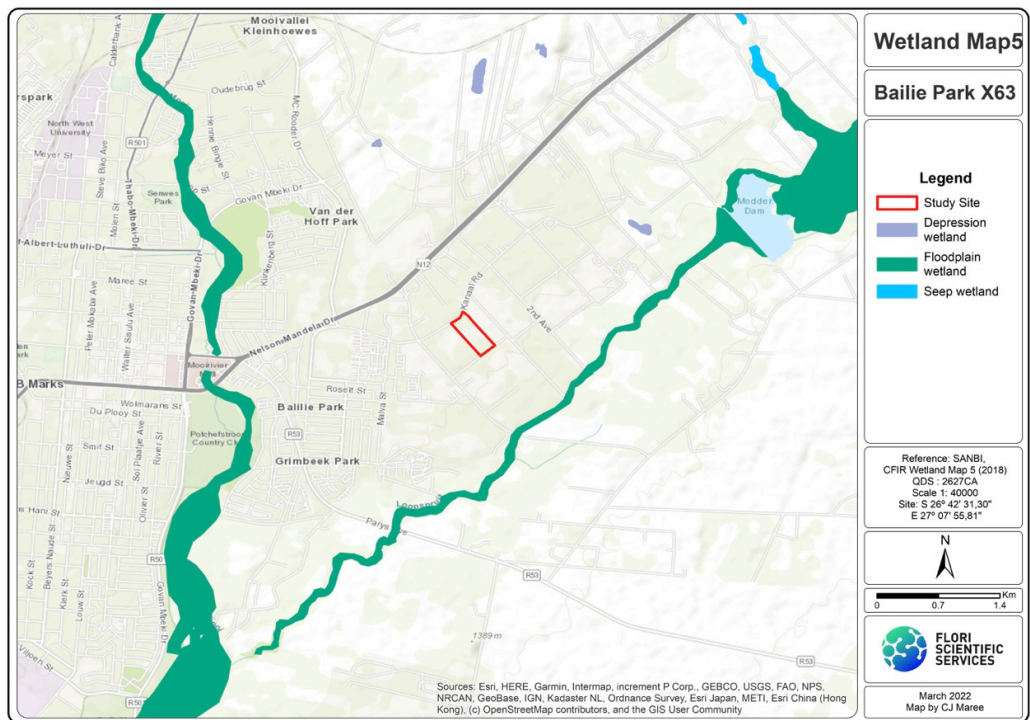


Figure 7: National Wetland Map (2018)

Strategic water source areas (SWSA) of South Africa

The study site is not situated within any Strategic Water Source Areas of South Africa (SWSA), including groundwater and surface water SWSAs.

Sensitivity Assessment

The sensitivity assessment identifies those areas and habitats within the study site that have a high conservation value and that may be sensitive to disturbance. All watercourses, including seasonal streams and drainage lines are, by default, viewed as sensitive, even if they are degraded. Areas or habitats have a higher conservation value (or sensitivity) based on their threatened ecosystem / veldtype status; ideal habitat for priority species (including Red Data species); species-richness; distinctive habitats; etc. Demarcated priority areas such as nature reserves also have a higher ecological sensitivity, even if not within a threatened ecosystem.

The habitats found on study site are uniform and in reality there is only one habitat of farmland or altered grassland. The habitat is therefore seen as farmland / altered grassland. The nearby Loopspruit was also assessed as a separate habitat of watercourses, although not on or adjacent to the study site.

The sensitivities of the habitats are first assessed separately in terms of fauna and flora (*refer to Table 17 & 18, Appendix D(5)*) and then combined into an overall ecological sensitivity analysis (*refer to Table 19, Appendix D(5)*).

Ecological Sensitivity Analysis

The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit, whether it is floristic or faunal in nature.

The initial ecological sensitivities are shown in five categories, which are then separated into a final group of three of high, medium and low.

Table 4: Ecological sensitivity analysis

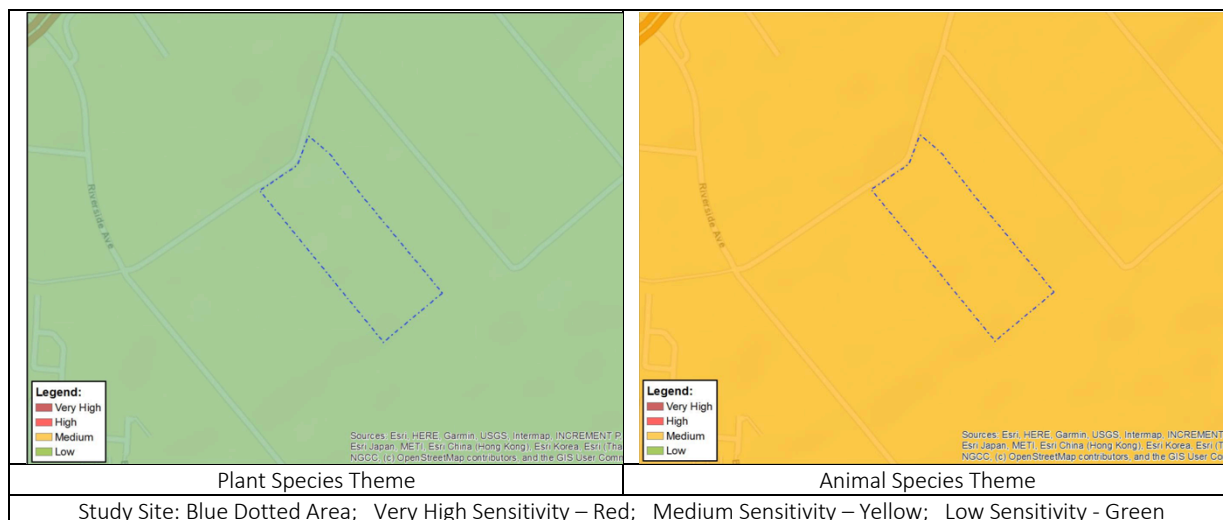
Ecological community	Floristic sensitivity	Faunal sensitivity	Ecological sensitivity	Ecological sensitivity group
Farmland / Altered Grassland	Low	Medium / Low	Medium / Low	Low
Watercourses	Medium	Medium	Medium	High

High: 80 – 100%; Medium/high: 60 – 80%; Medium: 40 – 60%; Medium/low: 20 – 40%; Low: 0 – 20%

In reality the biodiversity / ecological sensitivity of the Loopspruit is only 'medium', as shown in the above assessment. However, watercourses are, by default, are viewed and approached as sensitive, even if badly degraded or polluted. The Loopspruit should therefore be seen as having a default sensitivity of 'high'.

Screening Tool Desktop Assessment

The Department of Forestry, Fisheries and the Environment (DFFE) has developed a desktop screening tool that is to be used as a guideline in an initial desktop screening (assessment) of a project site (www.screening.environment.gov.za). The screening tool incorporates most datasets produced by DWS, DFFE, SANBI and Provincial Conservation Plans. However, it is important to keep in mind that the screening tool is a broad, desktop guideline that needs to be verified during site investigations (ground truthing). Depending on the levels of sensitivity shown in the screening assessment certain criteria in terms of assessments, studies, etc. can be required by relevant authorities.



Priority areas

The study area does not fall within any priority areas. Priority areas include formal and informal protected areas (nature reserves); important bird areas (IBAs); RAMSAR sites; National fresh water ecosystem priority areas (NFEPA) and National protected areas expansion strategy (NPAES) areas.

Critical Biodiversity Areas and Ecological Support Areas

According to North West Province’s Biodiversity Sector Plan (2015) the study site is not within a demarcated terrestrial Critical Biodiversity Area (CBA) or an Ecological Support Area (ESA) (Figure, **Error! Reference source not found.**). However, the site is within an aquatic ESA.

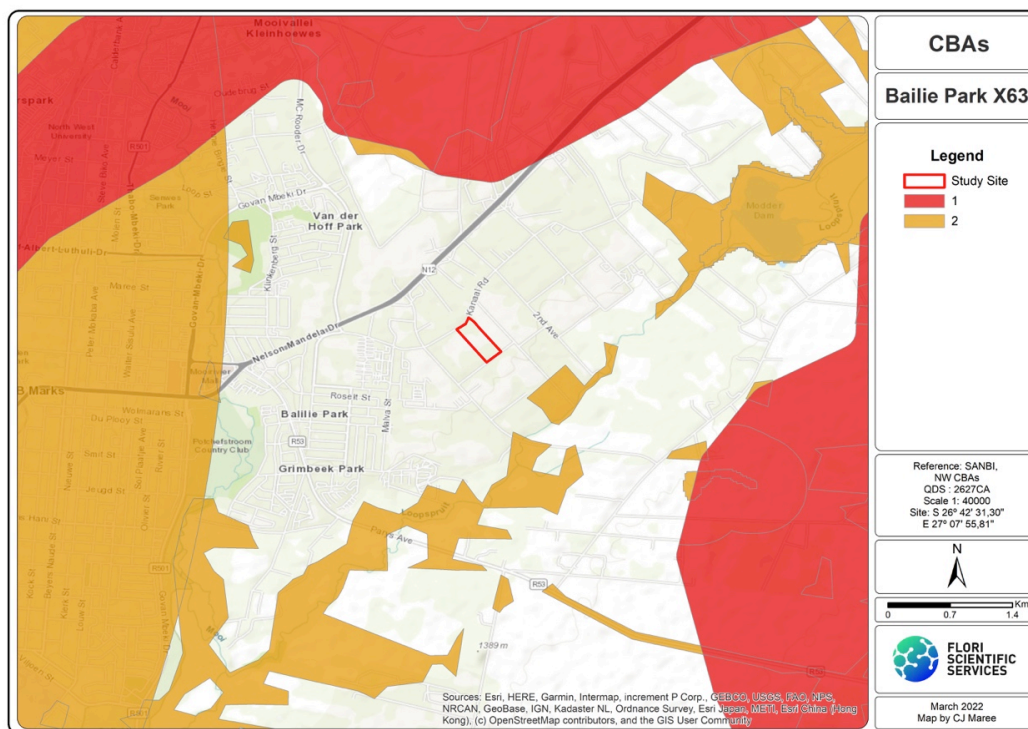


Figure 8: Critical Biodiversity Areas (CBAs)

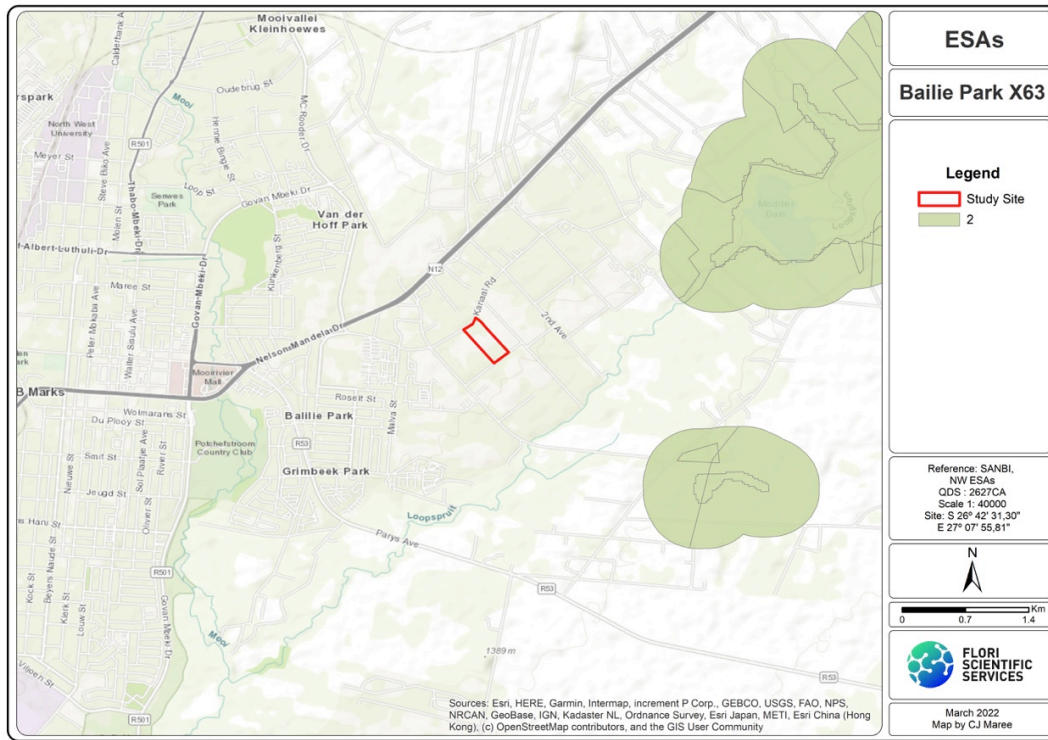


Figure 1: Ecological Support Areas (ESAs)

Sensitive areas identified during field investigations

No ‘high’ sensitive areas were identified within the study area. The nearby Loopspruit is a ‘high’ sensitivity area, but the proposed project will have no to very little impact on this stream. The overall sensitivity for the study site is ‘Low’. Figure 10 below, shows the sensitivity map for the study site.



Figure 10: Sensitivity Map

The Go, No-Go Option

There are no obvious fatal flaws and the project should be allowed to proceed.

Impact Assessment

Existing Impacts

The largest existing impacts on the area are the increasing levels of urbanisation, and ongoing farming practices such as cultivation and irrigation. In both instances there has been extensive loss of natural vegetation and habitat.

Potential Impacts

The project and related activities are medium negative impacts on the study site and medium impacts on the larger region. Impacts include the typical and standard impacts that accompany most township developments, such as loss of natural vegetation and loss of faunal habitat along with loss of actual fauna. The impacts are seen as medium because although there will be loss of vegetation and habitat, most of these natural elements have already been lost by the historical farming activities on the study site. The site is already low in terms of natural habitats and richness of fauna and flora. The site is also within a disturbed and altered environment and not on the edge of one, or on the edge of a more natural environment. It is also not very near or adjacent to any watercourses.

Assessment of potential impacts

The assessment of potential impacts on the natural environment arising from the project and related activities is shown below in Table 6.

The scoring method used in the impact assessment is as follows:

$$\text{Significance (SP)} = [\text{extent (E)} + \text{duration (D)} + \text{magnitude (M)}] \times \text{probability (P)}.$$

The maximum value is 100 significance points (SP). Environmental impacts will be rated as either that of High, Moderate or Low significance on the following basis:

$$\text{SP} \geq 60: \text{High}; \text{SP } 31 \geq 59: \text{Moderate}; \text{SP} \leq 30: \text{Low}.$$

Cumulative Impacts

Cumulative impacts can be defined as impacts or effects on the environment which are caused by the combined effects of past, current and future activities. Cumulative impacts (or the cumulative effect) are the sum of the overall impacts arising from the project (under the control of the developer / contractor), other activities (that may be under the control of others, including other developers, local communities, government and landowners) and other background pressures and trends which may be unregulated, including existing impacts.

The cumulative impacts are:

- Moderate in terms of localised impacts on the study site.
- Moderate to Low in terms of cumulative impacts on the region.

Levels of acceptable change

The cumulative negative impacts will increase in the localised area of the study site. The levels of change (increase in negative cumulative impacts) due to the activities of the proposed project are at acceptable levels for the area and for the project to proceed and not trigger any environmental 'fatal flaws'.

The project will have no positive impacts on the environment.

Table 6: Assessment of Potential Impacts

Potential Impacts arising from Project	Phase of Project	Impact Rating (Low: <30; Moderate: 31-59; High: >60)					
		Total Impact of Proposed Project					
		Extent	Duration	Magnitude	Probability	Total	Significance
	Construction Phase: Pre-mitigation	Local (2)	Long-term (4)	High (8)	High (4)	56	Moderate
	Construction Phase: Post mitigation	Site (1)	Long-term (4)	Moderate (6)	Medium (3)	33	Moderate
Mitigating Measures	1. Impacts on the existing natural environment related to the project are 'MODERATE' 2. Any temporary storage, lay-down areas or accommodation facilities to be setup in the study site area (property) itself. 3. Ensure a small footprint during construction phase. 4. All hazardous materials must be stored appropriately to prevent these contaminants from entering the water environment; 5. All excess materials brought onto site for construction must be removed after construction. 6. No open trenches or mounds of soils to be left. 7. A rehabilitation plan for disturbed areas to be compiled and implemented as part of the construction phase of the project. This includes access roads and temporary laydown / site office areas. 8. Site specific stormwater management plan is required. 9. No water may be used from out of the Loopspruit for construction purposes. 10. Under no circumstances may building rubble be dumped in the nearby open veld – not even temporarily. All rubble to be taken to an officially registered dumpsite.						
Cumulative Effect of Project on Terrestrial Ecology	After construction and during operational phase	Site (1)	Long-term (4)	Moderate (6)	Medium (3)	33	Moderate
Cumulative Effect of Project on Aquatic ecology	After construction and during operational phase	Site (1)	Long-term (4)	Low (4))	Medium (3)	27	Low
Individual Impacts							
		Extent	Duration	Magnitude	Probability	Total	Significance
1. Loss of natural vegetation	Construction Phase: Pre-mitigation	Site (1)	Long-term (4)	Moderate (6)	Medium (3)	33	Moderate
	Construction Phase: Post mitigation	Site (1)	Long-term (4)	Low (4))	Medium (3)	27	Low
Mitigating Measures	1. There are no protected trees or other RDL plant species on site.						

	<p>2. Any priority species encountered must be identified and rescue prior to any excavation or construction activities. However, it is unlikely that any are present within the study site or the road and road reserve.</p> <p>3. A weed control programme should be implemented. This can form part of the routine maintenance programme for the road.</p> <p>4. A site-specific rehabilitation plan is required for the project.</p>						
2. Loss or impact on wildlife	Construction Phase: Pre-mitigation	Site (1)	Long-term (4)	Moderate (6)	Medium (3)	33	Moderate
	Construction Phase: Post mitigation	Site (1)	Long-term (4)	Minor (2)	Medium (3)	27	Low
Mitigating Measures	<p>1. Care must be taken not to interact directly with any wild life encountered.</p> <p>2. Any bird nests encountered in the grass or trees must not be interfered with. If encountered must first be discussed with specialist as how best to proceed. This also applies to any active animal burrows encountered.</p> <p>3. No snakes encountered may be killed. A specialist must be called in and/or the issue must be brought to the attention of the ECO.</p>						
3. Impeding & Impounding waterflow	Construction Phase: Pre-mitigation	Local (2)	Short-term (2)	Low (4)	Low (2)	16	Low
	Construction Phase: Post mitigation	Site (1)	Short-term (2)	Minor (2)	Low (2)	10	Low
Mitigating Measures	<p>1. There are no watercourses on site.</p> <p>2. Site specific stormwater management plan is required, which is a basic condition of township developments.</p>						
4. Altering flow of a watercourse	Construction Phase: Pre-mitigation	Site (1)	Short-term (2)	Minor (2)	Low (2)	10	Low
	Construction Phase: Post mitigation	Site (1)	Short-term (2)	Minor (2)	Low (2)	10	Low
Mitigating Measures	<p>1. No watercourse crossings are envisioned for the construction phase or operation phase of the project. Hence, no altering of watercourses, impeding or impounding or watercourses.</p> <p>2. A site-specific stormwater management plan is required. This typically forms part of the engineering and layout plans. The ideal is to keep the flow and movement of surface stormwater and free and natural as possible.</p>						
5. Siltation and erosion	Construction Phase: Pre-mitigation	Local (2)	Short-term (2)	Moderate (6)	Medium (3)	30	Low
	Construction Phase: Post mitigation	Site (1)	Short-term (2)	Minor (2)	Low (2)	10	Low
Mitigating Measures	<p>1. All mitigating measures above have reference to siltation and erosion.</p> <p>2. Careful monitoring during the construction phase is essential to locate and mitigate any erosion observed. Investigations must be conducted after every rain downpour. Any problems need to be rectified immediately to avoid the problem escalating.</p> <p>3. All work areas must be monitored at all times and maintained.</p>						

6. Fringe impacts arising from construction phase	Construction Phase: Pre-mitigation	Site (1)	Short-term (2)	Moderate (6)	Medium (3)	27	Low
	Construction Phase: Post mitigation	Site (1)	Short-term (2)	Minor (2)	Low (2)	10	Low
Mitigating Measures	<p>1. Due to the nature of the project the potential for any significant fringe impacts can be medium, but with proper mitigating measure and routine maintenance and upkeep of the site, fringe impacts will be low.</p> <p>2. Care must be taken with heavy machinery used on the project. All access roads used during construction must be monitored and maintained.</p> <p>3. Soils and stones excavated may be used on site as backfill, fixing of roads, filling of dongas, etc.</p> <p>4. Excavated soils and rocks may not be simply dumped in any open veld or even on site.</p> <p>5. All temporary access roads, laydown areas, temporary camps, site offices, etc. must be fully rehabilitated by the contractors prior to final signing off of the construction phase of the project.</p> <p>6. Care must be taken not to negatively impact on the Loopspruit (stream) south of the project area. Any fringe impacts arising during construction, such as siltation, rubble dumped in the area, etc. must be addressed immediately and may not be left to the rehabilitation stage after completion of construction.</p>						

Conclusions and Recommendations

The following are the conclusions and recommendations of the study.

Conclusions

- The study site is within the original extent of Rand Highveld Grassland. However, the study site has been cultivated and work over the years and there is no pristine or good condition highveld grassland ecosystem present on site. The vegetation is mostly altered with some areas that have been transformed.
- The veldtype / ecosystem is threatened with a status of ‘Vulnerable’.
- There are no watercourses on site, including wetlands. The closest watercourse is the Loopspruit, which is more than 900 m southeast of the outer boundary of the site.
- The study site is not within any priority areas, including important birds areas (IBAs) and protected areas.
- The study site is not within any terrestrial CBAs or ESAs, but is within an aquatic ESA.
- No fauna or flora species of conservation concern (SCC) were observed on the study site.
- Site investigations were conducted during the summer (wet) season of the region and the findings and availability of field data is sufficient to reached acceptable findings and outcomes from the assessment.
- There are no obvious fatal flaws in terms of the natural environment.
- Taking all findings and recommendations into account it is the reasonable opinion of the author / specialist that the activity may be authorised. The project and related activities may proceed to the next phase.

Recommendations

- Recommended mitigating measures as proposed in this study and report should be implemented if the findings of this report are to remain pertinent.
- There is no need for any buffer zones.
- A site-specific rehabilitation plan, which must include a weed control plan, must be compiled for the project.
- A site-specific stormwater management plan must be compiled. This normally forms part of the engineering and architecture plans and designs.

9.2 SOCIO-ECONOMIC

9.2.1 Existing Zoning and Land Use

The site is currently zoned “Agricultural” according to the Tlokwe Town Planning Scheme, 2015. There is currently a dwelling house, several rental dwelling units, two swimming pools and outbuildings on the northern portion of the site. The remainder of the site is cultivated fields / lands that are either mowed or used for various farming activities typically found on smallholdings in the area.

9.2.2 Surrounding Land Uses

The character of the area is predominantly residential small holdings. To the West mainly medium to higher density developments are found. The addition of this medium density township will start or trigger future developments in this area.

9.2.3 Archaeology and Cultural Sites

A Heritage Impact Assessment study was conducted by Beyond Heritage in May 2023. *Refer to Appendix D(6).*

Findings of the Survey

Heritage Resources

The study area is generally flat without any major topographical features like pans or rocky outcrops that would be focal points for archaeological sites. The project area is completely disturbed through cultivation and modern structures and no heritage finds were identified.

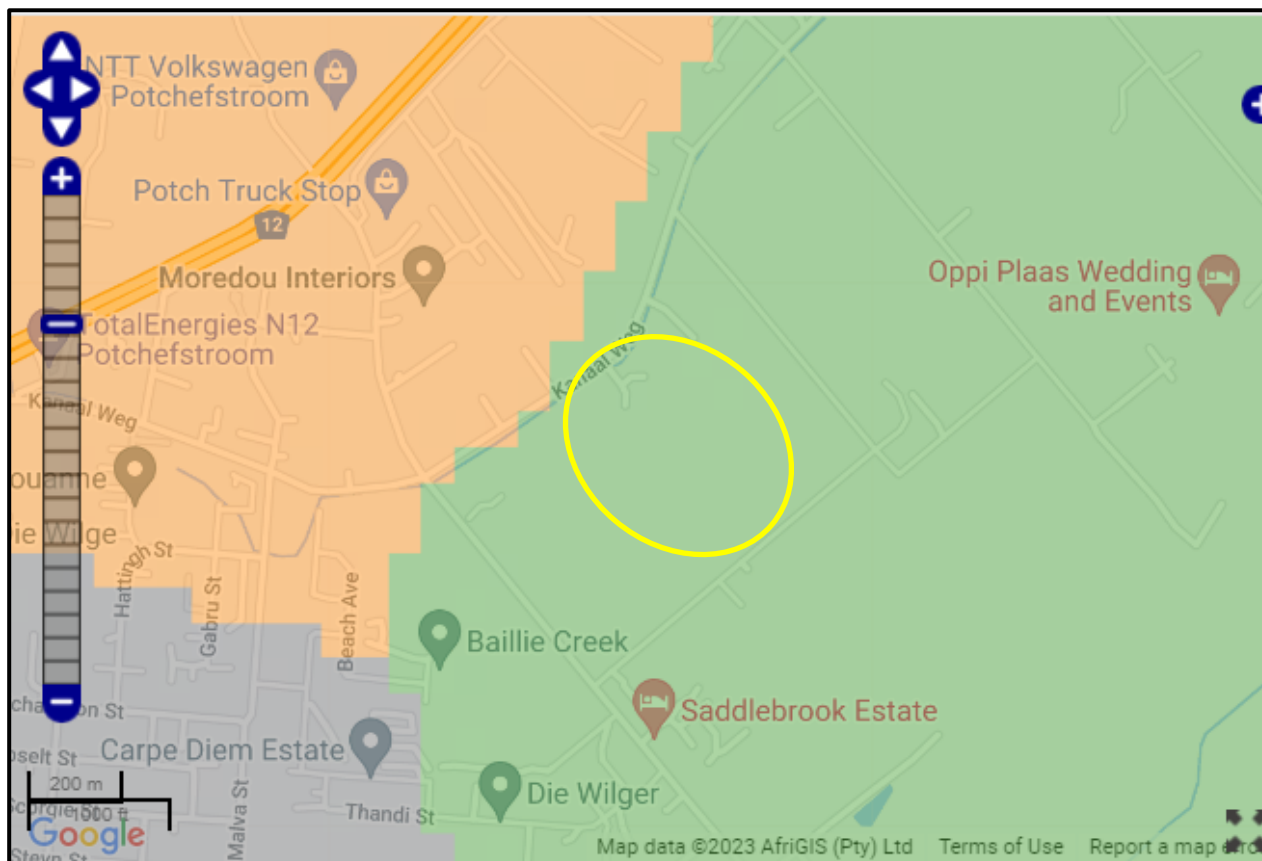
Cultural Landscape

The project area is situated in a landscape largely used for cultivation purposes. The project area has multiple modern structures but no structures are older than 60 years or situated within the proposed area of development.

Paleontological Heritage

The study area is indicated as of moderate paleontological significance on the SAHRA Paleontological map (*refer to Figure 11*) and an independent study was conducted near the project area (Bamford 2022), concluded the area lies in the Transvaal Basin of the Transvaal Supergroup where only some of the formations are present. It is unconformably overlain by much younger sands and alluvium of Quaternary age. Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the soils, sands and alluvium of the Quaternary. The

geological structures suggest that the rocks are either much too old to contain fossils or are transported sands and alluvium that do not preserve fossils. Furthermore, the materials to be excavated are these sands and alluvium and they do not preserve fossils. Since there is an extremely small chance that fossils from upstream may have been washed down the ancient river or present watercourse and may be disturbed, a Fossil Chance Find Protocol should be added to the EMPr.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 11: Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map

Potential Impact

Due to the lack of any heritage finds within the project area, no major impact to heritage resources is expected. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures as recommended in this report should be implemented during all phases of the project. Impacts of the project on heritage resources is expected to be low during all phases of the development.

Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

Operation Phase

No impacts are expected during the operation phase.

Impact Assessment for the project

Table 7: Impact assessment of the Project area.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (1)	Minor (1)
Probability	Improbable (2)	Improbable (2)
Significance	16 (Low)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation:		
<ul style="list-style-type: none"> • Implementation of a Chance Find Procedure for the project. 		

Cumulative impacts:

The proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.

Residual Impacts:

Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.

Conclusion and recommendations

The project area is situated within an urban landscape that was cultivated from prior to 1960. A large house and associated outbuildings are present within the project area but will not be part of the developed footprint. The development will take place on an open field which was used for cultivation. The development footprint has been transformed through development of modern structures (younger than 60 years) and cultivation. The project area is therefore considered to be of low heritage significance and no heritage sites or features were identified during the survey.

The palaeontological sensitivity of the study area is moderate, and an independent assessment was done nearby (Bamford 2022) that concluded the area lies on the moderately fossiliferous Quaternary sands and alluvium that might have transported and fragmentary fossils. None has been reported from the area to date and it is extremely unlikely that any fossils would be preserved in the soils, sands and alluvium of the Quaternary. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.

No adverse impact to heritage resources is expected by the project and it is recommended that the project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA.

Recommendations for condition of authorisation

No adverse impact to heritage resources is expected by the project and it is recommended that the project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

Chance Find ProceduresHeritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMPr. A short summary of chance find procedures is discussed below and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or trace fossils) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the trace fossils such as stromatolites in the dolomites or the Quaternary bones, rhizoliths, traces. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.

8. If no fossils are found and the excavations have finished, then no further monitoring is required.

Reasoned Opinion

The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

Potential risk

Potential risks to the proposed project are the occurrence of intangible features, sub surface cultural material and unrecorded burial sites. This can cause delays during construction, as well as additional costs involved in mitigation, as well as possible layout changes.

Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief:* As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 8: Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Resources chance finds	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> • If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: <ol style="list-style-type: none"> 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. 6. Only recommence operations once impacts have been mitigated.

Management Measures for inclusion in the EMPr

Table 9: Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Implement chance find procedures in case possible heritage finds are uncovered	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
General Project area	Regular monitoring of the development footprint by the ECO	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

9.2.4 Visual Impact

Visual intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.

High visual intrusion – results in a noticeable change or is discordant with the surroundings.

Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable.

Low visual intrusion – minimal change or blends in well with the surroundings.

The proposed development will change the scenic resources of the local area from an undeveloped area to a formal residential area.

The proposed development will require additional lighting on and in buildings and along roads. This will change the night landscape from unlit to lit. Visually, the township will provide modern and high aesthetical quality developments.

The visual intrusion is considered to be moderate as the proposed development will have minimal change and blends in with the surroundings.

9.2.5 Socio Economic Impact

The proposed residential development complies with development guidelines contained in Local legislation i.e. Tlokwe City Council Spatial Development Framework (SDF), 2015 and Land Use Management Framework, 2010 of the Tlokwe City Council.

The growing residential market and supply in this need, will stimulate economic growth. Any development and or investment in the area will also lead to upgrading of the area and stimulate more development and thus more investment.

The proposed development will be similar as the well-known De Land lifestyle estate just on a smaller scale. It will mainly cater for the elderly and their families, seeing that provision is made for care facilities, guest facilities and community facilities. This unique development will thus ideally for people who want to stay near their parents but not in the same house or erf.

The proposed development will promote job opportunities, ensure services for the erven, promoting diverse supply of land uses for Potchefstroom and utilized land which is not earmarked as unique agricultural land but has been earmarked as land for potential development within the urban edge.

The land uses will also continue to contribute and stimulate more private investment in and around Potchefstroom which is beneficial to the growth of the local economy.

During the construction phase temporary employment will be created and skills enhancement will take place. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

The proposed development will provide the Council with a higher income from the services and property

tax since more people will be making use of the services of the Council after the approval of this proposed township.

Negative social impacts associated with the proposed development mainly occur during the construction phase i.e. noise, dust, visual, security, safety and traffic. Mitigation measures are included in the EMPr. The most significant negative social impacts associated with the operational phase include increased traffic and extra pressure on the municipal infrastructure.

10 ENVIRONMENTAL IMPACT ASSESSMENT

The potential impacts of the proposed development were identified through a desktop study, a site visit, specialist studies and comments received during the public participation process. It is evident that the biggest impact of the project on the environment is expected to occur during the construction phase. It is expected that with the proposed mitigation of impacts and the implementation of the Environmental Management Programme, the expected negative impact could be mitigated to acceptable measures.

SIGNIFICANCE DESCRIPTION METHODOLOGY

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- (a) Nature: A brief written statement of the environmental aspect being impacted upon by a particular action or activity.
- (b) Extent: The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- (c) Duration: Indicates what the lifetime of the impact will be;
- (d) Intensity: Describes whether an impact is destructive or benign;
- (e) Probability: Describes the likelihood of an impact actually occurring; and
- (f) Cumulative: In relation to an activity, means the impact of an activity that in itself 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.

Table 10: CRITERIA TO BE USED FOR RATING OF IMPACTS

Criteria	Description			
Extent	National (4) The whole of South Africa	Regional (3) Provincial and parts of neighbouring provinces	Local (2) Within a radius of 2 km of the construction site	Site (1) Within the construction site
Duration	Permanent (4) 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	Long-term (3) The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.	Medium-term (2) The impact will last for the period of the construction phase, where after it will be entirely negated	Short-term (1) The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase

		The only class of impact which will be non-transitory		
Intensity	Very High (4) Natural, cultural and social functions and processes are altered to extent that they permanently cease	High (3) Natural, cultural and social functions and processes are altered to extent that they temporarily cease	Moderate (2) Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way	Low (1) Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected
Probability of occurrence	Definite (4) Impact will certainly occur	Highly Probable (3) Most likely that the impact will occur	Possible (2) The impact may occur	Improbable (1) Likelihood of the impact materialising is very low

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Table 11: CRITERIA TO BE USED FOR RATING OF CLASSIFIED IMPACTS

Low impact (4 - 6 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
Medium impact (7 - 9 points)	Mitigation is possible with additional design and construction inputs.
High impact (10 - 12 points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very high impact (13 - 20 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact.
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse.
It is important to note that the status of an impact is assigned based on the status quo – i.e. should the project not proceed. Therefore not all negative impacts are equally significant.	

Description and comparison of the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the planning & design, construction and operation phases for the various alternatives of the proposed development.

10.1 Planning and Design Phase

LAYOUT ALTERNATIVE 1 (PROPOSAL)			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation

<p>Impact on the Natural Habitat</p> <p><u>Layout</u> Insensitive layout can cause a negative impact on the natural habitat of not only the site itself, but also on the surrounding natural environment. The context of the development site within the macro area in terms of conservation areas also plays a major role when suitable areas for development are being considered. The development site (or parts thereof) could form part of important ecological corridors and such corridors could be destroyed if the functioning thereof is not being supported by the development proposal.</p> <p><u>The development site</u> A Biodiversity Impact Assessment concluded that the sensitivity of the site is regarded as low although the study site is within an Aquatic ESA.</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> Any temporary storage or accommodation facilities to be setup during construction to be within the site only. 	<p>NEGATIVE LOW</p>
<p>Availability of Civil and Electrical Services</p> <p>Adequate bulk water and sewerage capacity is available for the proposed development.</p> <p>No electrical capacity is available at this stage to supply the proposed township development with power.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> The proposed development will have to be totally off the electrical grid with Solar panels / Batteries and or Generators. 	<p>NEGATIVE LOW</p>
<p>Roads and infrastructure</p> <p>Some road upgradings are required to accommodate the traffic associated with the proposed development.</p>	<p>NEGATIVE HIGH</p>	<ul style="list-style-type: none"> The upgrading of Kanaal road to a 6m paved road with kerbing on both sides. The intersection with Modderdam road is to be constructed to the specifications of the NW Roads department. 	<p>NEGATIVE MEDIUM</p>
<p>Impact of Storm water</p> <p>Storm water management and design solutions must be based on ecologically sound principles (water retention, detention, infiltration, quality, re-cycling, etc.) and not only with functional safety aspects in mind. Permission for the discharge of storm water within watercourses must be subjected to proof of adherence to such principles.</p>	<p>NEGATIVE MEDIUM</p>	<p>A site specific stormwater management plan is required.</p>	<p>NEGATIVE LOW</p>

<p>Visual Impact (change of character and atmosphere of the area, change in land use)</p> <p>The visibility of the study area creates the opportunity to design a development that will enhance the “Sense of Place” of the study area and the surrounding area.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • The architectural styles and finishes must blend in tastefully with the surrounding environment. • Landscaping plays a crucial factor in reducing the visual impact of a development and proper planning is therefore required. <p>The following guidelines should apply:</p> <ul style="list-style-type: none"> • The general aim with landscaping should be to integrate it with the natural environment of the site and its surrounding area. Therefore, indigenous and generous landscaping, combined with the eradication of exotic vegetation, will conserve and enhance the natural character of the site and its surrounds. • The establishment of indigenous landscaped gardens and rehabilitation of the natural areas will contribute to the biodiversity of fauna in the area, which would add to the aesthetic experience of the site. <p>More detail with regards to landscaping principles and recommendations are stipulated in the Environmental Management Programme.</p>	<p>NEGATIVE LOW</p>
<p>Light Pollution</p> <ul style="list-style-type: none"> • Wrong placement, excessive brightness and careless light direction of especially security lights could cause sky glow, glare and light trespass. There is a general perception that ‘more and brighter are better’, and that it will provide for improved security. This perception can have a severe negative impact on the adjacent properties and surrounding area. • Drivers could be severely affected should lights within the development be too bright and incorrectly directed at roads. The glare of these lights might impair drivers’ vision and cause dangerous driving conditions. 	<p>NEGATIVE MEDIUM</p>	<p>In order to minimise light pollution and light nuisance, the following design principles should be adhered to when the lighting plan is finalised:</p> <ul style="list-style-type: none"> • All lighting should have a clear purpose - avoid use of lights simply to create a ‘presence’ at night. Unnecessary, obtrusive light will not be allowed. • Mount lights below the roof height of buildings and perimeter fencing and direct light downwards, to where it is needed. Lights can also be positioned so that they are shielded by buildings and trees in order to reduce overall visibility. • Avoid lights mounted on the side of buildings which shine directly out, dazzling adjacent residents as well as road users. • Fittings must be shielded or hooded to minimise sky glow by controlling upward light spillage. • Lights that minimise light spill are widely available and should be the only type of lights that are used. • Outside lighting should be designed to minimise impacts on fauna, reducing intensity of lights for nocturnal species and avoiding attraction / disruption of arthropod populations. Avoid fluorescent and mercury vapour lighting and use sodium vapour (yellow) lights. 	<p>NEGATIVE LOW</p>
INDIRECT IMPACTS			
<p>No indirect impacts were identified during the planning and design phase.</p>			
CUMULATIVE IMPACTS			
<p>No cumulative impacts were identified during the planning and design phase.</p>			

LAYOUT ALTERNATIVE 2			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation
<p>Impact on the Natural Habitat</p> <p><u>Layout</u> Insensitive layout can cause a negative impact on the natural habitat of not only the site itself, but also on the surrounding natural environment. The context of the development site within the macro area in terms of conservation areas also plays a major role when suitable areas for development are being considered. The development site (or parts thereof) could form part of important ecological corridors and such corridors could be destroyed if the functioning thereof is not being supported by the development proposal.</p> <p><u>The development site</u> A Biodiversity Impact Assessment concluded that the sensitivity of the site is regarded as low although the study site is within an Aquatic ESA.</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> Any temporary storage or accommodation facilities to be setup during construction to be within the site only. 	<p>NEGATIVE LOW</p>
<p>Availability of Civil and Electrical Services</p> <p>Adequate bulk water and sewerage capacity is available for the proposed development.</p> <p>No electrical capacity is available at this stage to supply the proposed township development with power.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> The proposed development will have to be totally off the electrical grid with Solar panels / Batteries and or Generators. 	<p>NEGATIVE LOW</p>
<p>Roads and infrastructure</p> <p>Some road upgradings are required to accommodate the traffic associated with the proposed development.</p>	<p>NEGATIVE HIGH</p>	<ul style="list-style-type: none"> The upgrading of Kanaal road to a 6m paved road with kerbing on both sides. The intersection with Modderdam road is to be constructed to the specifications of the NW Roads department. Road on the southern border of site to be upgraded. 	<p>NEGATIVE MEDIUM</p>
<p>Impact of Storm water</p> <p>Storm water management and design solutions must be based on ecologically sound principles</p>	<p>NEGATIVE MEDIUM</p>	<p>A site specific stormwater management plan is required.</p>	<p>NEGATIVE LOW</p>

<p>(water retention, detention, infiltration, quality, re-cycling, etc.) and not only with functional safety aspects in mind. Permission for the discharge of storm water within watercourses must be subjected to proof of adherence to such principles.</p>			
<p>Visual Impact (change of character and atmosphere of the area, change in land use)</p> <p>The visibility of the study area creates the opportunity to design a development that will enhance the “Sense of Place” of the study area and the surrounding area.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • The architectural styles and finishes must blend in tastefully with the surrounding environment. • Landscaping plays a crucial factor in reducing the visual impact of a development and proper planning is therefore required. <p>The following guidelines should apply:</p> <ul style="list-style-type: none"> • The general aim with landscaping should be to integrate it with the natural environment of the site and its surrounding area. Therefore, indigenous and generous landscaping, combined with the eradication of exotic vegetation, will conserve and enhance the natural character of the site and its surrounds. • The establishment of indigenous landscaped gardens and rehabilitation of the natural areas will contribute to the biodiversity of fauna in the area, which would add to the aesthetic experience of the site. <p>More detail with regards to landscaping principles and recommendations are stipulated in the Environmental Management Programme.</p>	<p>NEGATIVE LOW</p>
<p>Light Pollution</p> <ul style="list-style-type: none"> • Wrong placement, excessive brightness and careless light direction of especially security lights could cause sky glow, glare and light trespass. There is a general perception that ‘more and brighter are better’, and that it will provide for improved security. This perception can have a severe negative impact on the adjacent properties and surrounding area. • Drivers could be severely affected should lights within the development be too bright and incorrectly directed at roads. The glare of these lights might impair drivers’ vision and cause dangerous driving conditions. 	<p>NEGATIVE MEDIUM</p>	<p>In order to minimise light pollution and light nuisance, the following design principles should be adhered to when the lighting plan is finalised:</p> <ul style="list-style-type: none"> • All lighting should have a clear purpose - avoid use of lights simply to create a ‘presence’ at night. Unnecessary, obtrusive light will not be allowed. • Mount lights below the roof height of buildings and perimeter fencing and direct light downwards, to where it is needed. Lights can also be positioned so that they are shielded by buildings and trees in order to reduce overall visibility. • Avoid lights mounted on the side of buildings which shine directly out, dazzling adjacent residents as well as road users. • Fittings must be shielded or hooded to minimise sky glow by controlling upward light spillage. • Lights that minimise light spill are widely available and should be the only type of lights that are used. • Outside lighting should be designed to minimise impacts on fauna, reducing intensity of lights for nocturnal species and avoiding attraction / disruption of arthropod populations. Avoid fluorescent and mercury vapour lighting and use sodium vapour (yellow) lights. 	<p>NEGATIVE LOW</p>
INDIRECT IMPACTS			
<p>No indirect impacts were identified during the planning and design phase.</p>			

CUMULATIVE IMPACTS			
No cumulative impacts were identified during the planning and design phase.			

NO GO ALTERNATIVE			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation:
No direct impacts were identified during the planning and design phase.			
INDIRECT IMPACTS			
No indirect impacts were identified during the planning and design phase.			
CUMULATIVE IMPACTS			
No cumulative impacts were identified during the planning and design phase.			

10.2 Construction Phase

LAYOUT ALTERNATIVE 1 (PROPOSAL)			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation:
Impact on the Natural Habitat	NEGATIVE MEDIUM	Detail mitigation measures are stipulated in the EMPr and include the following: <ul style="list-style-type: none"> Any temporary storage, lay-down areas or accommodation facilities to be setup in the study site area (property) itself. Ensure a small footprint during construction phase. All hazardous materials must be stored appropriately to prevent these contaminants from entering the water environment; All excess materials brought onto site for construction must be removed after construction. No open trenches or mounds of soils to be left. A rehabilitation plan for disturbed areas to be compiled and implemented as part of the construction phase of the project. This includes access roads and temporary laydown / site office areas. Site specific stormwater management plan is required. No water may be used from out of the Loopspruit for construction purposes. 	NEGATIVE MEDIUM

		<ul style="list-style-type: none"> Under no circumstances may building rubble be dumped in the nearby open veld – not even temporarily. All rubble to be taken to an officially registered dumpsite. 	
<p>Loss of natural vegetation</p> <p>There are no protected trees or other RDL plant species on site.</p>	<p>NEGATIVE MEDIUM</p>	<p>Detail mitigation measures are stipulated in the EMPr and include the following:</p> <ul style="list-style-type: none"> Any priority species encountered must be identified and rescue prior to any excavation or construction activities. However, it is unlikely that any are present within the study site or the road and road reserve. A weed control programme should be implemented. This can form part of the routine maintenance programme for the road. A site-specific rehabilitation plan is required for the project. 	<p>NEGATIVE LOW</p>
<p>Loss or impact on wildlife</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> Care must be taken not to interact directly with any wild life encountered. Any bird nests encountered in the grass or trees must not be interfered with. If encountered must first be discussed with specialist as how best to proceed. This also applies to any active animal burrows encountered. No snakes encountered may be killed. A specialist must be called in and/or the issue must be brought to the attention of the ECO. 	<p>NEGATIVE LOW</p>
<p>Siltation and erosion</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> A site-specific stormwater management plan is required. The ideal is to keep the flow and movement of surface stormwater and free and natural as possible. Careful monitoring during the construction phase is essential to locate and mitigate any erosion observed. Investigations must be conducted after every rain downpour. Any problems need to be rectified immediately to avoid the problem escalating. All work areas must be monitored at all times and maintained. 	<p>NEGATIVE LOW</p>
<p>Fringe impacts arising from construction phase</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> Due to the nature of the project the potential for any significant fringe impacts can be medium, but with proper mitigating measure and routine maintenance and upkeep of the site, fringe impacts will be low. Care must be taken with heavy machinery used on the project. All access roads used during construction must be monitored and maintained. Soils and stones excavated may be used on site as backfill, fixing of roads, filling of dongas, etc. Excavated soils and rocks may not be simply dumped in any open veld or even on site. All temporary access roads, laydown areas, temporary camps, site offices, etc. must be fully rehabilitated by 	<p>NEGATIVE LOW</p>

		<p>the contractors prior to final signing off of the construction phase of the project.</p> <ul style="list-style-type: none"> Care must be taken not to negatively impact on the Loopspruit (stream) south of the project area. Any fringe impacts arising during construction, such as siltation, rubble dumped in the area, etc. must be addressed immediately and may not be left to the rehabilitation stage after completion of construction. 	
<p>Impact on Water Sources</p> <p>During construction, the risk of pollution of surface and groundwater can generally be related to diesel, oil and concrete spills that may result in a change in water quality with the associated negative impact on humans and the natural habitat. Groundwater pollution during the construction phase is also associated with poor construction techniques.</p> <p>Diesel, oil and lubricant spills are the main concern in respect of water pollution during construction together with organic pollution caused by inadequately managed facilities at the work sites.</p>	<p>NEGATIVE MEDIUM</p>	<p>Mitigation measures in the Environmental Management Programme include measures to ensure acceptable construction practices to minimise or avoid the risk of contamination of water sources. These include:</p> <p>Construction Site</p> <ul style="list-style-type: none"> Encourage the construction contractor to employ local people as far as is reasonably practical and encourage the contractor to transport them daily to and from site. This would reduce solid and liquid waste production and water demand at the site camp. During and after construction, stormwater control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. so that export of soil into any watercourse is avoided. <p>Diesel, hydraulic fluid and lubricants</p> <ul style="list-style-type: none"> Minimise on-site storage of petroleum products; Ensure measures to contain spills readily available on site (spill kits). All petrochemical leaks and spills must be appropriately contained and disposed of at a licensed waste disposal site. <p>Construction Vehicles</p> <ul style="list-style-type: none"> All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be undertaken beyond the contractor laydown area. Should any transfer of vehicle fuel take place on site, it is important to demarcate a specific area for this purpose. This area should be covered with an impermeable layer to prevent any penetration of fuel and oil spillage into the soil. The area could also be sloped towards an oil trap or sump to ease collection of spilled substances. All construction vehicles should be serviced on a regular basis to minimise the risk of oil spillage on site. Servicing of vehicles or equipment must take place off-site at appropriate workshop facilities. When not in use, construction vehicles must be parked in an area provided with an impermeable layer to prevent leaks and spills from penetrating the substrate. <p>Construction site domestic waste and sewage</p> <ul style="list-style-type: none"> Minimise on-site accommodation. 	<p>NEGATIVE LOW</p>

		<ul style="list-style-type: none"> • Deposit solid waste in containers and dispose at municipal waste disposal sites regularly. • Dispose of liquid waste (grey water) with sewerage. • Install appropriate ablution facilities. • Preferably utilise municipal systems or chemical toilets. <p>Construction site inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc)</p> <ul style="list-style-type: none"> • Ensure compliance with stringent daily clean up requirements on site. • Dispose at municipal waste disposal sites. <p>Construction site hazardous waste</p> <ul style="list-style-type: none"> • All hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain 110% of the total volume of materials stored at any given time. • Material safety data sheets (MSDSs) are to be clearly displayed for all hazardous materials. • The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report. • Employees should be provided with absorbent spill kits and disposal containers to handle spillages. • Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimise potential spillages. • Employees should record and report any spillages to the responsible person. • An Emergency Preparedness and Response Plan will be developed and implemented should and incident occur. • Access to storage areas on site must be restricted to authorised employees only. • Contractors will be held liable for any environmental damages caused by spillages. 	
<p>Geology</p> <p>Stability of structures and excavations.</p> <p>The property is not subject to dolomite related instabilities.</p>	<p>NEGATIVE MEDIUM</p>	<p>Strict implementation of site-specific precautionary measures with regard to design and construction of the proposed structures to be implemented. These include:</p> <ul style="list-style-type: none"> • The presence of potentially compressible material beneath the foundations that could cause localized differential settlement under loading or when saturated, especially in the period after construction until a state of equilibrium has been achieved, • The presence of potentially expansive material beneath the foundations that could lead to severe structural damage over time as a result of ongoing seasonal heave and shrinkage associated with changes in soil moisture content, • The presence of weathered bedrock exhibiting moderately hard rock consistency from a depth of between 1.1 and 2.1 m that could adversely affect the installation of buried services in localized portions of the study area. 	<p>NEGATIVE LOW</p>

<p>Drainage</p>		<ul style="list-style-type: none"> • The inferred formation of a weak seasonal perched groundwater table within the soil-like overburden that could cause structural degradation over time as a result of rising damp, and • Moderately highly localized portion along the eastern boundary of the site, as well as in the extreme north of the property, that exhibit slopes of between 4.5 and 6° that will require additional work during construction. • Foundation recommendations and solutions by the geotechnical engineer to be implemented. • The seasonal occurrence of a weak perched water table at a depth of less than between 0.6 and 1.6 m requires incorporation of suitable damp-proofing measures within the foundations and beneath floor slabs and road surfaces to protect against the effects of rising damp. • Foundation construction in areas exhibiting slopes of between 4.5 and 6° (i.e., Zone A2) will require terracing through the addition of extra masonry units in foundation walls. • The inferred high corrosivity of the natural soil with regard to steel (e.g., rebar) should be considered during construction. • The generally nearly level topography indicates that large portions of Zone A1 are prone to ponding of surface water, especially after heavy precipitation events. In this light, proper site drainage that includes the removal of water runoff from roofs is essential to prevent seasonal ponding of surface water and large-scale changes in soil moisture beneath and near structures. Additionally, the angles of stormwater and sewer pipelines will have to artificially enhanced to allow proper functioning thereof. • Those areas with moderate slopes, classified as Zone A2, will require with additional earthworks along access roads and the implementation of stormwater control measures to prevent scouring of unpaved areas where surface runoff could collect. 	
<p>Special precautionary measures</p>		<ul style="list-style-type: none"> • The clayey soil-like materials that will be removed during construction could be suitable for re-use in compacted engineered fills beneath roads and foundations, provided excessively coarse particles, as well as the relatively plastic fines fraction, are removed. It must be noted that the natural materials generally occurring from a depth of between 0.2 and 0.5 m classify as SC-type material according to the USCS standards, and exhibit in-situ strength considered marginally sufficient for the construction of a low volume access road. Proper preparation and layering work will, however, be necessary. 	

<p>Generalised recommendations</p>		<ul style="list-style-type: none"> • Excavated material was backfilled in bulk with the TLB, and as such not re-compacted as required for engineered layer works. As such, it should be noted that if structures are considered to be positioned across or over excavated test pits, the material must be properly compacted in order to prevent the occurrence of differential settlement. • This also applies for structures positioned across or over existing septic tanks (where present), where excavations for the removal of large trees took place, waste pits, swimming pools, old foundations, etc. • Trenches may have to be dewatered after heavy precipitation events. • The sidewalls of excavations in excess of 1.0 m should be shored to prevent injury or death due to the risk and probability of sidewall <u>failure by collapse and/or overbreak.</u> • It is recommended that the development be connected to a conventional municipal bulk sewerage removal system for off-site treatment of liquid waste. On-site sanitation systems that rely on seepage for the disposal of liquid wastes (e.g., a septic tank that drain into a “French Drain”-type soak-away) should not be utilized. Alternatively, use can be made of a sealed conservancy system that requires regular servicing. • Wet services (i.e., water supply pipes and sewers) must be designed and maintained to prevent leaks and blockages, and proper backfilling should be enforced to reduce storm water inflow. • Water-loving plants and trees should preferably not be placed within 1.5 m of any structure or wet services. Gardening directly next to structures should be discouraged. • It is recommended that a services-level geotechnical investigation (corresponding to a NHBRC Phase II investigation) be conducted during placement of bulk services within the proposed township in order to identify and assess localized sub-surface conditions at variance with that encountered during this investigation. • It is further recommended that a geo-professional inspect foundation and service trenches to identify and address sub-surface conditions at variance with that encountered during this investigation. • Additionally, site-specific geotechnical investigations should be conducted. 	
<p>Topographical Impacts</p> <p>Alteration of topography due to stockpiling of soil, building material and debris and waste material on site.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • All stockpiles must be restricted to designated areas and are not to exceed a height of 2 metres. • Stockpiles created during the construction phase are not to remain during the operational phase. • The contractor must be limited to clearly defined access routes to ensure that sensitive and undisturbed areas are not disturbed. 	<p>NEGATIVE LOW</p>

<p>Soils Impacts</p> <p>Removal and compaction of soil during construction activities. Erosion, degradation and loss of topsoil due to construction activities as well as surface and stormwater run-off.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Strip topsoil prior to any construction activities. • Reuse topsoil to rehabilitate disturbed areas. • Topsoil must be kept separate from overburden and must not be used for building purposes or maintenance or access roads. • Minimise the clearance of vegetation to avoid exposure of soil. • Protect areas susceptible to erosion with mulch or a suitable alternative. • Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. • Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and run-off. 	<p>NEGATIVE LOW</p>
<p>Air Quality Impacts</p> <p>Dust and emissions during construction generated by debris handling and debris piles, truck transport, bulldozing, general construction.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Dust must be suppressed on the construction site and during the transportation of material during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Loads could be covered to avoid loss of material in transport, especially if material is transported off site. • Dust and mud should be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the site boundary. • Facilities for the washing of vehicles should be provided at the entry and exit points. • A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas. • During the transfer of materials, drop heights should be minimised to control the dispersion of mater being transferred. • The height of all stockpiles on site should be a maximum of 2m. • Use of dust retardant road surfacing if required due to the exceedance of Air Quality Guidelines. 	<p>NEGATIVE LOW</p>
<p>Impacts associated with construction activities such as noise, and safety</p> <p>The negative impact of noise, generally associated with construction activities, are temporary, occurring mostly during the construction phase. In terms of safety, it should be noted that the project involves deep excavations and open trenches. Excavations and open trenches can act as a trap for children (and also snakes, small mammals and lizards).</p>	<p>NEGATIVE MEDIUM</p>	<p><u>Noise mitigation measures</u></p> <ul style="list-style-type: none"> • All construction activities should be undertaken according to daylight working hours between the hours of 07:00 – 17:00 on weekdays and 7:30 –13:00 on Saturdays. • No construction activities may be undertaken on Sunday. • Provide all equipment with standard silencers. • Maintain silencer units in vehicles and equipment in good working order. • All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. • Construction staff working in area where the 8-hour ambient noise levels exceed 60 dBA must have the appropriate Personal Protective Equipment (PPE). • All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993) <p>Safety mitigation measures</p>	<p>NEGATIVE MEDIUM</p>

		<ul style="list-style-type: none"> • The area affected by construction must be fenced prior to any activities taking place. • All excavated areas must be clearly marked, and barrier tape must be placed around them for safety purposes. • A Fire Management Plan has to be identified during the pre-construction phase and must be implemented throughout the construction and operation phases of the development. 	
<p>Traffic (construction vehicles)</p> <p>The construction phase is likely to generate additional traffic in terms of construction vehicles and heavy vehicles delivering materials to the site.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • The heavy construction vehicles should avoid the local roads during peak traffic times and large deliveries should also be scheduled outside the peak traffic times. • Signs should be erected in the vicinity of the site. • Construction vehicles are to avoid main roads during peak traffic hours. • All vehicles entering the Site are to be roadworthy. • When using heavy or large vehicles / equipment, “spotters” are to be present to assist the driver with his blind spots. • Any incident or damage to a vehicle must be reported immediately. 	<p>NEGATIVE MEDIUM</p>
<p>Traffic (road network)</p> <p>The proposed development would have a significant impact on the current road network when developed to its full potential and requires some road upgradings.</p>	<p>NEGATIVE MEDIUM</p>	<p>The impact of the development traffic can be mitigated by means of the following:</p> <ul style="list-style-type: none"> • Kanaal road to be upgraded to a 6m paved road with kerbing on both sides. • The intersection with Modderdam road to be constructed to the specifications of the NW Roads department. 	<p>NEGATIVE MEDIUM</p>
<p>Availability of Civil and Electrical Services</p> <p>Adequate bulk water and sewerage is available.</p> <p>Electrical capacity is not available. The proposed development to be totally off the electrical grid with Solar panels / Batteries and or Generators.</p>	<p>NEGATIVE MEDIUM</p>	<p>When energy efficiency measures are considered, the following guidelines are to be followed:</p> <p>Regulatory standards:</p> <ol style="list-style-type: none"> SANS 204 Energy Efficiency in Building & SANS 10400 Part X & XA Application of the National Building Act – Energy Usage. <p>Architectural point of design:</p> <ol style="list-style-type: none"> Aluminium windows, larger northern openings to maximize solar radiation in winter and minimize it in summer; Smaller southern windows to prevent cold radiation in winter; & Correct orientation, north facing. <p>From an energy usage point of design:</p> <ol style="list-style-type: none"> Equipment and appliances - Energy efficient electrical stoves or Gas stoves; high energy star rating appliances should be used Cooking – Gas should be considered in all households Water heating – By law, 50% of our water heating should be by means of alternative energy. Solar / Gas geysers or Heat pumps Energy efficient lighting such as LED’s 	<p>NEGATIVE LOW</p>

		e) PV solar system and/ in combination with battery system will minimize grid supply	
<p>Impact of Labourers</p> <p>An uncontrolled influx of labourers with resulting increase in crime and squatting would place pressure on the natural environment (placement of snares, removal of trees for firewood, careless waste disposal, etc.). This could be severe, resulting in permanent damage to the environment if not mitigated properly.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Mitigation measures to counter impact on the natural environment and limit potential for crime during the construction phase should include specifications in terms of control of construction workers (i.e. provision of toilet and cooking facilities, provision of either accommodation facilities or transport facilities, implementation of Environmental Educational Programmes, etc.). Accommodation for labourers must either be limited to guarding personnel on the construction site (with labourers transported to and from existing neighbouring towns) or a separate fenced and controlled area where proper accommodation and relevant facilities are provided. Part of the adjudication process for the successful contractor to undertake the civil works must be the use of casual and unskilled labour to stimulate local job creation through the use of labour-intensive methods where possible. If possible all labour should be sourced locally. Contractors and their families may not stay on site. No informal settlements will be allowed 	NEGATIVE LOW
<p>Safety</p> <p>Public safety during construction.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Members of the public adjacent to the construction site should be notified of construction activities in order to limit unnecessary disturbance or interference. Construction activities will be undertaken during daylight hours and not on Sundays. 	NEGATIVE LOW
<p>Safety</p> <p>Construction staff safety during construction.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction. All construction staff must have the appropriate PPE. The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. Report and record any environmental, health and safety incidents to the responsible person. 	NEGATIVE MEDIUM
<p>Heritage</p> <p>During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.</p>	NEGATIVE LOW	<p>If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:</p> <ul style="list-style-type: none"> Cease all works immediately; Report incident to the Sustainability Manager; Contact an archaeologist/ palaeontologist to inspect the site; Report incident to the competent authority; and Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. Only recommence operations once impacts have been mitigated. 	NEGATIVE LOW

<p>Existing services and infrastructure</p> <p>Damage to the existing services and infrastructure during the construction phase and disruptions in services (i.e. electricity, water, damage to Telkom cables) during the construction phase.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Determine areas where services will be upgraded and relocated well in advance; • Discuss possible disruptions with affected parties to determine most convenient times for service disruptions and warn affected parties well in advance of dates that service disruptions will take place 	<p>NEGATIVE LOW</p>
<p>Waste Management</p> <p><u>Builder's and domestic waste</u> The construction phase will create large quantities of builder's and domestic waste to be accommodated by local legal landfill sites.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Prevent unhygienic usage on site and pollution of the natural assets. • Develop a central waste temporary holding site to be used during construction. (Near the access entrance). This site should comply with the following: • Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • Bunded areas for containment and holding of dry building waste. • These areas shall be predetermined and located in areas that is already disturbed. • These areas shall not be in close proximity of any watercourse. 	<p>NEGATIVE LOW</p>
<p><u>Sewage waste</u> Generation and disposal of sewage waste of temporary construction toilets.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • On-site chemical toilets will be provided for domestic purposes during construction phase. • The contractors will be responsible for the maintenance of the chemical toilets. • No temporary facilities or portable toilets to be setup within 50m of any watercourse. • No French drain systems may be installed. • Should any spills or incidents occur; the material will be cleaned up immediately and disposed of appropriately. • All incidents must be reported to the responsible site officer as soon as it occurs. 	<p>NEGATIVE LOW</p>
<p>Visual Impact</p> <p>Site clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the emergence of exposed areas of bare soil.</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> • Phased, rather than indiscriminate clearing of the site to be undertaken. • The architectural and landscape architectural guidelines for the proposed development will be developed to allow for a positive aesthetic influence on the surrounding environment. The guidelines will include aspects of finishes, lights pollution, colours to blend into the surrounding colours, heights of buildings, and roof finishes. Aesthetics and contextual appropriateness is to be a major aspect of these guidelines. 	<p>NEGATIVE LOW</p>
<p>Economic impacts</p> <p>Positive economic impacts are anticipated. The impact on employment would be positive, and although the impact is expected to be small; any contribution to more</p>	<p>POSITIVE HIGH</p>	<p>Employment opportunities will be generated.</p> <ul style="list-style-type: none"> • All labour (skilled and unskilled) and contractors should be sourced locally where possible. • A labour and recruitment policy must be developed, displayed and implemented by the contractor. • Recruitment at the construction site will not be allowed. 	

employment is an achievement in South Africa.		<ul style="list-style-type: none"> • Where possible, labour intensive practices (as opposed to mechanised) should be practiced. • The principles of equality, BEE, gender equality and non-discrimination will be implemented. 	
INDIRECT IMPACTS			
No indirect impacts were identified			
CUMULATIVE IMPACTS			
Cumulative Effect of Project on Terrestrial Ecology	NEGATIVE MEDIUM		
Cumulative Effect of Project on Aquatic ecology	NEGATIVE LOW		
<p>Cumulative Effect of Project on Heritage</p> <p>Other authorised projects (e.g., residential developments) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage is low as no sites of significance will be impacted on by the new developments.</p>	NEGATIVE LOW		

LAYOUT ALTERNATIVE 2			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation:
Impact on the Natural Habitat	NEGATIVE MEDIUM	<p>Detail mitigation measures are stipulated in the EMPr and include the following:</p> <ul style="list-style-type: none"> • Any temporary storage, lay-down areas or accommodation facilities to be setup in the study site area (property) itself. • Ensure a small footprint during construction phase. • All hazardous materials must be stored appropriately to prevent these contaminants from entering the water environment; • All excess materials brought onto site for construction must be removed after construction. • No open trenches or mounds of soils to be left. • A rehabilitation plan for disturbed areas to be compiled and implemented as part of the construction phase of the project. This includes access roads and temporary laydown / site office areas. • Site specific stormwater management plan is required. • No water may be used from out of the Loopspruit for construction purposes. 	NEGATIVE MEDIUM

		<ul style="list-style-type: none"> Under no circumstances may building rubble be dumped in the nearby open veld – not even temporarily. All rubble to be taken to an officially registered dumpsite. 	
<p>Loss of natural vegetation</p> <p>There are no protected trees or other RDL plant species on site.</p>	<p>NEGATIVE MEDIUM</p>	<p>Detail mitigation measures are stipulated in the EMPr and include the following:</p> <ul style="list-style-type: none"> Any priority species encountered must be identified and rescue prior to any excavation or construction activities. However, it is unlikely that any are present within the study site or the road and road reserve. A weed control programme should be implemented. This can form part of the routine maintenance programme for the road. A site-specific rehabilitation plan is required for the project. 	<p>NEGATIVE LOW</p>
<p>Loss or impact on wildlife</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> Care must be taken not to interact directly with any wild life encountered. Any bird nests encountered in the grass or trees must not be interfered with. If encountered must first be discussed with specialist as how best to proceed. This also applies to any active animal burrows encountered. No snakes encountered may be killed. A specialist must be called in and/or the issue must be brought to the attention of the ECO. 	<p>NEGATIVE LOW</p>
<p>Siltation and erosion</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> A site-specific stormwater management plan is required. The ideal is to keep the flow and movement of surface stormwater and free and natural as possible. Careful monitoring during the construction phase is essential to locate and mitigate any erosion observed. Investigations must be conducted after every rain downpour. Any problems need to be rectified immediately to avoid the problem escalating. All work areas must be monitored at all times and maintained. 	<p>NEGATIVE LOW</p>
<p>Fringe impacts arising from construction phase</p>	<p>NEGATIVE LOW</p>	<ul style="list-style-type: none"> Due to the nature of the project the potential for any significant fringe impacts can be medium, but with proper mitigating measure and routine maintenance and upkeep of the site, fringe impacts will be low. Care must be taken with heavy machinery used on the project. All access roads used during construction must be monitored and maintained. Soils and stones excavated may be used on site as backfill, fixing of roads, filling of dongas, etc. Excavated soils and rocks may not be simply dumped in any open veld or even on site. All temporary access roads, laydown areas, temporary camps, site offices, etc. must be fully rehabilitated by 	<p>NEGATIVE LOW</p>

		<p>the contractors prior to final signing off of the construction phase of the project.</p> <ul style="list-style-type: none"> Care must be taken not to negatively impact on the Loopspruit (stream) south of the project area. Any fringe impacts arising during construction, such as siltation, rubble dumped in the area, etc. must be addressed immediately and may not be left to the rehabilitation stage after completion of construction. 	
<p>Impact on Water Sources</p> <p>During construction, the risk of pollution of surface and groundwater can generally be related to diesel, oil and concrete spills that may result in a change in water quality with the associated negative impact on humans and the natural habitat. Groundwater pollution during the construction phase is also associated with poor construction techniques.</p> <p>Diesel, oil and lubricant spills are the main concern in respect of water pollution during construction together with organic pollution caused by inadequately managed facilities at the work sites.</p>	<p>NEGATIVE MEDIUM</p>	<p>Mitigation measures in the Environmental Management Programme include measures to ensure acceptable construction practices to minimise or avoid the risk of contamination of water sources. These include:</p> <p>Construction Site</p> <ul style="list-style-type: none"> Encourage the construction contractor to employ local people as far as is reasonably practical and encourage the contractor to transport them daily to and from site. This would reduce solid and liquid waste production and water demand at the site camp. During and after construction, stormwater control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. so that export of soil into any watercourse is avoided. <p>Diesel, hydraulic fluid and lubricants</p> <ul style="list-style-type: none"> Minimise on-site storage of petroleum products; Ensure measures to contain spills readily available on site (spill kits). All petrochemical leaks and spills must be appropriately contained and disposed of at a licensed waste disposal site. <p>Construction Vehicles</p> <ul style="list-style-type: none"> All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be undertaken beyond the contractor laydown area. Should any transfer of vehicle fuel take place on site, it is important to demarcate a specific area for this purpose. This area should be covered with an impermeable layer to prevent any penetration of fuel and oil spillage into the soil. The area could also be sloped towards an oil trap or sump to ease collection of spilled substances. All construction vehicles should be serviced on a regular basis to minimise the risk of oil spillage on site. Servicing of vehicles or equipment must take place off-site at appropriate workshop facilities. When not in use, construction vehicles must be parked in an area provided with an impermeable layer to prevent leaks and spills from penetrating the substrate. <p>Construction site domestic waste and sewage</p> <ul style="list-style-type: none"> Minimise on-site accommodation. 	<p>NEGATIVE LOW</p>

		<ul style="list-style-type: none"> • Deposit solid waste in containers and dispose at municipal waste disposal sites regularly. • Dispose of liquid waste (grey water) with sewerage. • Install appropriate ablution facilities. • Preferably utilise municipal systems or chemical toilets. <p>Construction site inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc)</p> <ul style="list-style-type: none"> • Ensure compliance with stringent daily clean up requirements on site. • Dispose at municipal waste disposal sites. <p>Construction site hazardous waste</p> <ul style="list-style-type: none"> • All hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain 110% of the total volume of materials stored at any given time. • Material safety data sheets (MSDSs) are to be clearly displayed for all hazardous materials. • The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report. • Employees should be provided with absorbent spill kits and disposal containers to handle spillages. • Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimise potential spillages. • Employees should record and report any spillages to the responsible person. • An Emergency Preparedness and Response Plan will be developed and implemented should and incident occur. • Access to storage areas on site must be restricted to authorised employees only. • Contractors will be held liable for any environmental damages caused by spillages. 	
<p>Geology</p> <p>Stability of structures and excavations.</p> <p>The property is not subject to dolomite related instabilities.</p>	<p>NEGATIVE MEDIUM</p>	<p>Strict implementation of site-specific precautionary measures with regard to design and construction of the proposed structures to be implemented. These include:</p> <ul style="list-style-type: none"> • The presence of potentially compressible material beneath the foundations that could cause localized differential settlement under loading or when saturated, especially in the period after construction until a state of equilibrium has been achieved, • The presence of potentially expansive material beneath the foundations that could lead to severe structural damage over time as a result of ongoing seasonal heave and shrinkage associated with changes in soil moisture content, • The presence of weathered bedrock exhibiting moderately hard rock consistency from a depth of between 1.1 and 2.1 m that could adversely affect the installation of buried services in localized portions of the study area. 	<p>NEGATIVE LOW</p>

<p>Generalised recommendations</p>		<ul style="list-style-type: none"> • Excavated material was backfilled in bulk with the TLB, and as such not re-compacted as required for engineered layer works. As such, it should be noted that if structures are considered to be positioned across or over excavated test pits, the material must be properly compacted in order to prevent the occurrence of differential settlement. • This also applies for structures positioned across or over existing septic tanks (where present), where excavations for the removal of large trees took place, waste pits, swimming pools, old foundations, etc. • Trenches may have to be dewatered after heavy precipitation events. • The sidewalls of excavations in excess of 1.0 m should be shored to prevent injury or death due to the risk and probability of sidewall <u>failure by collapse and/or overbreak.</u> • It is recommended that the development be connected to a conventional municipal bulk sewerage removal system for off-site treatment of liquid waste. On-site sanitation systems that rely on seepage for the disposal of liquid wastes (e.g., a septic tank that drain into a “French Drain”-type soak-away) should not be utilized. Alternatively, use can be made of a sealed conservancy system that requires regular servicing. • Wet services (i.e., water supply pipes and sewers) must be designed and maintained to prevent leaks and blockages, and proper backfilling should be enforced to reduce storm water inflow. • Water-loving plants and trees should preferably not be placed within 1.5 m of any structure or wet services. Gardening directly next to structures should be discouraged. • It is recommended that a services-level geotechnical investigation (corresponding to a NHBRC Phase II investigation) be conducted during placement of bulk services within the proposed township in order to identify and assess localized sub-surface conditions at variance with that encountered during this investigation. • It is further recommended that a geo-professional inspect foundation and service trenches to identify and address sub-surface conditions at variance with that encountered during this investigation. • Additionally, site-specific geotechnical investigations should be conducted. 	
<p>Topographical Impacts</p> <p>Alteration of topography due to stockpiling of soil, building material and debris and waste material on site.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • All stockpiles must be restricted to designated areas and are not to exceed a height of 2 metres. • Stockpiles created during the construction phase are not to remain during the operational phase. • The contractor must be limited to clearly defined access routes to ensure that sensitive and undisturbed areas are not disturbed. 	<p>NEGATIVE LOW</p>

<p>Soils Impacts</p> <p>Removal and compaction of soil during construction activities. Erosion, degradation and loss of topsoil due to construction activities as well as surface and stormwater run-off.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Strip topsoil prior to any construction activities. • Reuse topsoil to rehabilitate disturbed areas. • Topsoil must be kept separate from overburden and must not be used for building purposes or maintenance or access roads. • Minimise the clearance of vegetation to avoid exposure of soil. • Protect areas susceptible to erosion with mulch or a suitable alternative. • Implement the appropriate topsoil and stormwater runoff control management measures as per the EMP to prevent the loss of topsoil. • Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and run-off. 	<p>NEGATIVE LOW</p>
<p>Air Quality Impacts</p> <p>Dust and emissions during construction generated by debris handling and debris piles, truck transport, bulldozing, general construction.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Dust must be suppressed on the construction site and during the transportation of material during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Loads could be covered to avoid loss of material in transport, especially if material is transported off site. • Dust and mud should be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the site boundary. • Facilities for the washing of vehicles should be provided at the entry and exit points. • A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas. • During the transfer of materials, drop heights should be minimised to control the dispersion of mater being transferred. • The height of all stockpiles on site should be a maximum of 2m. • Use of dust retardant road surfacing if required due to the exceedance of Air Quality Guidelines. 	<p>NEGATIVE LOW</p>
<p>Impacts associated with construction activities such as noise, and safety.</p> <p>The negative impact of noise, generally associated with construction activities, are temporary, occurring mostly during the construction phase. In terms of safety, it should be noted that the project involves deep excavations and open trenches. Excavations and open trenches can act as a trap for children (and also snakes, small mammals and lizards).</p>	<p>NEGATIVE MEDIUM</p>	<p><u>Noise mitigation measures</u></p> <ul style="list-style-type: none"> • All construction activities should be undertaken according to daylight working hours between the hours of 07:00 – 17:00 on weekdays and 7:30 –13:00 on Saturdays. • No construction activities may be undertaken on Sunday. • Provide all equipment with standard silencers. • Maintain silencer units in vehicles and equipment in good working order. • All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. • Construction staff working in area where the 8-hour ambient noise levels exceed 60 dBA must have the appropriate Personal Protective Equipment (PPE). • All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993) <p>Safety mitigation measures</p>	<p>NEGATIVE MEDIUM</p>

		<ul style="list-style-type: none"> • The area affected by construction must be fenced prior to any activities taking place. • All excavated areas must be clearly marked, and barrier tape must be placed around them for safety purposes. • A Fire Management Plan has to be identified during the pre-construction phase and must be implemented throughout the construction and operation phases of the development. 	
<p>Traffic (construction vehicles)</p> <p>The construction phase is likely to generate additional traffic in terms of construction vehicles and heavy vehicles delivering materials to the site.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • The heavy construction vehicles should avoid the local roads during peak traffic times and large deliveries should also be scheduled outside the peak traffic times. • Signs should be erected in the vicinity of the site. • Construction vehicles are to avoid main roads during peak traffic hours. • All vehicles entering the Site are to be roadworthy. • When using heavy or large vehicles / equipment, “spotters” are to be present to assist the driver with his blind spots. • Any incident or damage to a vehicle must be reported immediately. 	<p>NEGATIVE MEDIUM</p>
<p>Traffic (road network)</p> <p>The proposed development would have a significant impact on the current road network when developed to its full potential and requires some road upgradings.</p>	<p>NEGATIVE MEDIUM</p>	<p>The impact of the development traffic can be mitigated by means of the following:</p> <ul style="list-style-type: none"> • Kanaal road to be upgraded to a 6m paved road with kerbing on both sides. • The intersection with Modderdam road to be constructed to the specifications of the NW Roads department. • Road on the southern border of site to be upgraded. 	<p>NEGATIVE MEDIUM</p>
<p>Availability of Civil and Electrical Services</p> <p>Adequate bulk water and sewerage is available.</p> <p>Electrical capacity is not available. The proposed development to be totally off the electrical grid with Solar panels / Batteries and or Generators.</p>	<p>NEGATIVE MEDIUM</p>	<p>When energy efficiency measures are considered, the following guidelines are to be followed:</p> <p>Regulatory standards:</p> <ol style="list-style-type: none"> SANS 204 Energy Efficiency in Building & SANS 10400 Part X & XA Application of the National Building Act – Energy Usage. <p>Architectural point of design:</p> <ol style="list-style-type: none"> Aluminium windows, larger northern openings to maximize solar radiation in winter and minimize it in summer; Smaller southern windows to prevent cold radiation in winter; & Correct orientation, north facing. <p>From an energy usage point of design:</p> <ol style="list-style-type: none"> Equipment and appliances - Energy efficient electrical stoves or Gas stoves; high energy star rating appliances should be used Cooking – Gas should be considered in all households Water heating – By law, 50% of our water heating should be by means of alternative energy. Solar / Gas geysers or Heat pumps Energy efficient lighting such as LED’s 	<p>NEGATIVE LOW</p>

		e) PV solar system and/ in combination with battery system will minimize grid supply	
<p>Impact of Labourers</p> <p>An uncontrolled influx of labourers with resulting increase in crime and squatting would place pressure on the natural environment (placement of snares, removal of trees for firewood, careless waste disposal, etc.). This could be severe, resulting in permanent damage to the environment if not mitigated properly.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Mitigation measures to counter impact on the natural environment and limit potential for crime during the construction phase should include specifications in terms of control of construction workers (i.e. provision of toilet and cooking facilities, provision of either accommodation facilities or transport facilities, implementation of Environmental Educational Programmes, etc.). Accommodation for labourers must either be limited to guarding personnel on the construction site (with labourers transported to and from existing neighbouring towns) or a separate fenced and controlled area where proper accommodation and relevant facilities are provided. Part of the adjudication process for the successful contractor to undertake the civil works must be the use of casual and unskilled labour to stimulate local job creation through the use of labour-intensive methods where possible. If possible all labour should be sourced locally. Contractors and their families may not stay on site. No informal settlements will be allowed 	NEGATIVE LOW
<p>Safety</p> <p>Public safety during construction.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Members of the public adjacent to the construction site should be notified of construction activities in order to limit unnecessary disturbance or interference. Construction activities will be undertaken during daylight hours and not on Sundays. 	NEGATIVE LOW
<p>Safety</p> <p>Construction staff safety during construction.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction. All construction staff must have the appropriate PPE. The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. Report and record any environmental, health and safety incidents to the responsible person. 	NEGATIVE MEDIUM
<p>Heritage</p> <p>During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.</p>	NEGATIVE LOW	<p>If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:</p> <ul style="list-style-type: none"> Cease all works immediately; Report incident to the Sustainability Manager; Contact an archaeologist/ palaeontologist to inspect the site; Report incident to the competent authority; and Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. Only recommence operations once impacts have been mitigated. 	NEGATIVE LOW
<p>Existing services and infrastructure</p>	NEGATIVE MEDIUM		NEGATIVE LOW

Damage to the existing services and infrastructure during the construction phase and disruptions in services (i.e. electricity, water, damage to Telkom cables) during the construction phase.		<ul style="list-style-type: none"> • Determine areas where services will be upgraded and relocated well in advance; • Discuss possible disruptions with affected parties to determine most convenient times for service disruptions and warn affected parties well in advance of dates that service disruptions will take place 	
<p>Waste Management</p> <p><u>Builder's and domestic waste</u> The construction phase will create large quantities of builder's and domestic waste to be accommodated by local legal landfill sites.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> • Prevent unhygienic usage on site and pollution of the natural assets. • Develop a central waste temporary holding site to be used during construction. (Near the access entrance). This site should comply with the following: • Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • Bunded areas for containment and holding of dry building waste. • These areas shall be predetermined and located in areas that is already disturbed. • These areas shall not be in close proximity of any watercourse. 	NEGATIVE LOW
<p><u>Sewage waste</u> Generation and disposal of sewage waste of temporary construction toilets.</p>	NEGATIVE MEDIUM	<ul style="list-style-type: none"> • On-site chemical toilets will be provided for domestic purposes during construction phase. • The contractors will be responsible for the maintenance of the chemical toilets. • No temporary facilities or portable toilets to be setup within 50m of any watercourse. • No French drain systems may be installed. • Should any spills or incidents occur; the material will be cleaned up immediately and disposed of appropriately. • All incidents must be reported to the responsible site officer as soon as it occurs. 	NEGATIVE LOW
<p>Visual Impact</p> <p>Site clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the emergence of exposed areas of bare soil.</p>	NEGATIVE LOW	<ul style="list-style-type: none"> • Phased, rather than indiscriminate clearing of the site to be undertaken. • The architectural and landscape architectural guidelines for the proposed development will be developed to allow for a positive aesthetic influence on the surrounding environment. The guidelines will include aspects of finishes, lights pollution, colours to blend into the surrounding colours, heights of buildings, and roof finishes. Aesthetics and contextual appropriateness is to be a major aspect of these guidelines. 	NEGATIVE LOW
<p>Economic impacts</p> <p>Positive economic impacts are anticipated. The impact on employment would be positive, and although the impact is expected to be small; any contribution to more employment is an achievement in South Africa.</p>	POSITIVE HIGH	<p>Employment opportunities will be generated.</p> <ul style="list-style-type: none"> • All labour (skilled and unskilled) and contractors should be sourced locally where possible. • A labour and recruitment policy must be developed, displayed and implemented by the contractor. • Recruitment at the construction site will not be allowed. • Where possible, labour intensive practices (as opposed to mechanised) should be practiced. 	

		• The principles of equality, BEE, gender equality and non-discrimination will be implemented.	
INDIRECT IMPACTS			
No indirect impacts were identified			
CUMULATIVE IMPACTS			
Cumulative Effect of Project on Terrestrial Ecology	NEGATIVE MEDIUM		
Cumulative Effect of Project on Aquatic ecology	NEGATIVE LOW		
Cumulative Effect of Project on Heritage	NEGATIVE LOW		
<p>Other authorised projects (e.g., residential developments) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage is low as no sites of significance will be impacted on by the new developments.</p>			

NO GO ALTERNATIVE			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation:
<p>All the impacts outlined above will not apply to the No-Go alternative as the status quo will apply and the environment will remain as it is currently. However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts.</p>			
DIRECT IMPACTS			
No indirect impacts were identified during the construction phase.			
CUMULATIVE IMPACTS			

No cumulative impacts were identified during the construction phase.			
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10.3 Operational Phase

LAYOUT ALTERNATIVE 1 (PROPOSAL)			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation:
Impact on the natural habitat Due to the present degraded state of the development site, the removal of alien invasive plants coupled with indigenous landscaping as proposed will have a positive effect on the biodiversity of not only the site itself, but also its surrounds.	POSITIVE HIGH	Landscaping guidelines as stipulated in the EMPr must be followed during the operational phase of the project.	POSITIVE HIGH
Impact on water resources The proposed development could have a negative impact on water resources. Increased coverage of paved/hardened surfaces may increase the volume and velocity of stormwater runoff.	NEGATIVE MEDIUM	Stormwater Management are addressed in the Environmental Management Programme (EMPr).	NEGATIVE LOW
Hydrogeology Impacts Leaks of untreated water from pipelines may occur and impact on the groundwater quality.	NEGATIVE MEDIUM	Any leaks should be fixed immediately and areas rehabilitated as needed.	NEGATIVE LOW
Traffic impact The proposed development could have a significant impact on the current road network when developed to its full potential.	NEGATIVE MEDIUM	The impact of the development traffic can be mitigated by means of the recommended road upgradings. Access to the site will be obtained from the upgraded Kanaal Road. The existing entrance on the southern boundary will be moved westwards and be utilized as a service/emergency entry via the existing road over Portion 14 of the farm Vyfhoek 428 IQ and to join up with the Modderdam road (D1208) to the west.	NEGATIVE MEDIUM
Lighting pollution	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Security lighting must be carefully planned. These lights must not spill into the eyes of oncoming traffic and must not shine into adjacent properties; Interior lighting must be subtle and in order to prevent it from lighting up the sky and from using energy, the implementation of movement switches (especially for large glassed interior areas that are highly visible) should be considered; Exterior lighting, especially the lighting in the vicinity of the open space areas must be designed to shine 	NEGATIVE LOW

		<p>downwards and the bulbs to be used should rather be “dim” than bright;</p> <ul style="list-style-type: none"> • Prevent the implementation of exterior advertising signs and name boards that will flicker into the eyes of surrounding neighbours and into the eyes of oncoming traffic; • Obtain the necessary approvals for the erection of advertising and other signs. 	
<p>Waste Management</p> <p>No municipal waste services are available at the site.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Waste minimisation strategies should be implemented i.e. recycling. • The owner/developer is responsible for collection and disposal of the domestic household refuse by their own contractor at own cost to the Municipal permitted general landfill site. • The owner/developer must register at the Municipality as a user to make use of the permitted landfill site to dispose the general household refuse and the necessary tariffs will be applied accordingly. • A Waste Management Plan must be submitted to the Waste Management Section for approval. • No hazardous, medical or contaminated refuse will be accepted at the permitted landfill site of the Municipality. The owner/developer must make the necessary arrangements with such service providers who handle this type of refuse. • The permitted landfill site is only permitted for general household refuse. • An education and awareness program to promote separation at source initiative must also be considered as part of the Home Owners Association to the occupants. • An adequate number of general waste receptacles, including bins must be arranged around the site to collect all domestic refuse, and to minimise littering. • Bins must be provided on site for use by employees. • Bins should be clearly marked and lined for efficient control and safe disposal of waste. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. • A fenced area must be allocated for waste sorting and disposal on the site. • 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. • Waste bins should be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance. • All general waste must be removed from the site at regular intervals and disposed of in suitable waste receptacle. 	<p>NEGATIVE LOW</p>

Visual impact and impact on Sense of Place	NEGATIVE MEDIUM	<ul style="list-style-type: none"> The architectural design of the buildings and structures should conform to best practice in visual and aesthetic standards. Waste bins must be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance. 	NEGATIVE LOW
Agricultural Impact The proposed development will entail the transformation of 9.1745 ha of land previously used for agricultural purposes.	NEGATIVE LOW	As the site is deemed to be an uneconomical farming unit, no mitigation measures are proposed.	NEGATIVE LOW
Provision of housing and a Life Style Centre that includes, a social hall, restaurant, guest units, offices, and medical consulting rooms (care centre for the elderly). The proposed development will contribute to the provision of residential accommodation for the growing residential market needs. It will mainly cater for the elderly and their families, seeing that provision is made for care facilities, guest facilities and community facilities. This unique development will thus ideally be for people who want to stay near their parents but not in the same house or erf. POSITIVE IMPACT	POSITIVE HIGH		
Socio-Economic Impact The impact on employment would be positive, and although the impact is expected to be small; any contribution to more employment is an achievement in South Africa. POSITIVE IMPACT	POSITIVE LOW		
Noise Impact Noise caused by residents, movement of residents, traffic, generators etc.	NEGATIVE LOW	<ul style="list-style-type: none"> All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993). 	NEGATIVE LOW
Socio-Economic Impact The proposed development will provide the Council with a	POSITIVE MEDIUM		

higher income from the services and property tax since more people will be making use of the services of the Council after the approval of this proposed township. POSITIVE IMPACT			
Energy Energy consumption	NEGATIVE MEDIUM	<ul style="list-style-type: none"> It is recommended that renewable energy options and/or alternative energy sources be used. Sustainable design principles must be implemented 	NEGATIVE LOW
INDIRECT IMPACTS			
No indirect impacts have been identified			
CUMULATIVE IMPACTS			
Municipal Infrastructure The extra pressure that this development could place on the existing municipal infrastructure for waste and sewage disposal as well as water provisions could be significant when seen together with other developments within the greater municipal area.	NEGATIVE MEDIUM	The availability of bulk water, sewer and electricity confirmed.	
Traffic The proposed development together with other developments in the region would have a significant impact on the current road network.	NEGATIVE MEDIUM	<ul style="list-style-type: none"> Intersections which do not have sufficient spare capacity to accommodate the existing and future background traffic should be upgraded. Bulk services to be extended as part of this development to accommodate further development in this area, in accordance with the SPLUMA master planning. 	
Noise Noise pollution from vehicles, generators, noise associated with human habitation as well as domestic animals, dogs etc.	NEGATIVE MEDIUM	<ul style="list-style-type: none"> All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993). 	
Cumulative Effect of Project on Terrestrial Ecology	NEGATIVE MEDIUM		
Cumulative Effect of Project on Aquatic ecology	NEGATIVE LOW		
Cumulative Effect of Project on Heritage Other authorised projects (e.g., residential developments) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage is low as no sites of significance will be	NEGATIVE LOW		

impacted on by the new developments.			
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LAYOUT ALTERNATIVE 2			
DIRECT IMPACTS			
Potential Impacts	Significance Rating	Mitigation Measures	Significance rating of impacts after mitigation:
<p>Impact on the natural habitat</p> <p>Due to the present degraded state of the development site, the removal of alien invasive plants coupled with indigenous landscaping as proposed will have a positive effect on the biodiversity of not only the site itself, but also its surrounds.</p>	<p>POSITIVE HIGH</p>	<p>Landscaping guidelines as stipulated in the EMPr must be followed during the operational phase of the project.</p>	<p>POSITIVE HIGH</p>
<p>Impact on water resources</p> <p>The proposed development could have a negative impact on water resources. Increased coverage of paved/hardened surfaces may increase the volume and velocity of stormwater runoff.</p>	<p>NEGATIVE MEDIUM</p>	<p>Stormwater Management are addressed in the Environmental Management Programme (EMPr).</p>	<p>NEGATIVE LOW</p>
<p>Hydrogeology Impacts</p> <p>Leaks of untreated water from pipelines may occur and impact on the groundwater quality.</p>	<p>NEGATIVE MEDIUM</p>	<p>Any leaks should be fixed immediately and areas rehabilitated as needed.</p>	<p>NEGATIVE LOW</p>
<p>Traffic impact</p> <p>The proposed development could have a significant impact on the current road network when developed to its full potential.</p> <p>The access on the road on the southern border, to be extended up to Modderdam Road, will have a significant impact on residents to the south of the site.</p>	<p>NEGATIVE HIGH</p>	<p>The impact of the development traffic can be mitigated by means of the recommended road upgradings.</p> <p>Access to the site will be obtained from the upgraded Kanaal Road and the No Name Street on the Southern side (main entrance). The No name street to be upgraded. The No Name street access to provide access to the Residential 1 units.</p>	<p>NEGATIVE HIGH</p>
<p>Lighting pollution</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Security lighting must be carefully planned. These lights must not spill into the eyes of oncoming traffic and must not shine into adjacent properties; • Interior lighting must be subtle and in order to prevent it from lighting up the sky and from using energy, the implementation of movement switches (especially for large glassed interior areas that are highly visible) should be considered; 	<p>NEGATIVE LOW</p>

		<ul style="list-style-type: none"> • Exterior lighting, especially the lighting in the vicinity of the open space areas must be designed to shine downwards and the bulbs to be used should rather be “dim” than bright; • Prevent the implementation of exterior advertising signs and name boards that will flicker into the eyes of surrounding neighbours and into the eyes of oncoming traffic; • Obtain the necessary approvals for the erection of advertising and other signs. 	
<p>Waste Management</p> <p>No municipal waste services are available at the site.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Waste minimalisation strategies should be implemented i.e. recycling. • The owner/developer is responsible for collection and disposal of the domestic household refuse by their own contractor at own cost to the Municipal permitted general landfill site. • The owner/developer must register at the Municipality as a user to make use of the permitted landfill site to dispose the general household refuse and the necessary tariffs will be applied accordingly. • A Waste Management Plan must be submitted to the Waste Management Section for approval. • No hazardous, medical or contaminated refuse will be accepted at the permitted landfill site of the Municipality. The owner/developer must make the necessary arrangements with such service providers who handle this type of refuse. • The permitted landfill site is only permitted for general household refuse. • An education and awareness program to promote separation at source initiative must also be considered as part of the Home Owners Association to the occupants. • An adequate number of general waste receptacles, including bins must be arranged around the site to collect all domestic refuse, and to minimise littering. • Bins must be provided on site for use by employees. • Bins should be clearly marked and lined for efficient control and safe disposal of waste. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. • A fenced area must be allocated for waste sorting and disposal on the site. • 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. • Waste bins should be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance. 	<p>NEGATIVE LOW</p>

		<ul style="list-style-type: none"> All general waste must be removed from the site at regular intervals and disposed of in suitable waste receptacle. 	
Visual impact and impact on Sense of Place	NEGATIVE MEDIUM	<ul style="list-style-type: none"> The architectural design of the buildings and structures should conform to best practice in visual and aesthetic standards. Waste bins must be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance. 	NEGATIVE LOW
Agricultural Impact The proposed development will entail the transformation of 9.1745 ha of land previously used for agricultural purposes.	NEGATIVE LOW	As the site is deemed to be an uneconomical farming unit, no mitigation measures are proposed.	NEGATIVE LOW
Provision of housing and a Life Style Centre that includes, a social hall, restaurant, guest units, offices, and medical consulting rooms (care centre for the elderly). The proposed development will contribute to the provision of residential accommodation for the growing residential market needs. It will mainly cater for the elderly and their families, seeing that provision is made for care facilities, guest facilities and community facilities. This unique development will thus ideally be for people who want to stay near their parents but not in the same house or erf. POSITIVE IMPACT	POSITIVE HIGH		
Socio-Economic Impact The impact on employment would be positive, and although the impact is expected to be small; any contribution to more employment is an achievement in South Africa. POSITIVE IMPACT	POSITIVE LOW		
Noise Impact Noise caused by residents, movement of residents, traffic, generators etc.	NEGATIVE LOW	<ul style="list-style-type: none"> All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993). 	NEGATIVE LOW

<p>Socio-Economic Impact</p> <p>The proposed development will provide the Council with a higher income from the services and property tax since more people will be making use of the services of the Council after the approval of this proposed township.</p> <p>POSITIVE IMPACT</p>	<p>POSITIVE MEDIUM</p>		
<p>Energy</p> <p>Energy consumption</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • It is recommended that renewable energy options and/or alternative energy sources be used. • Sustainable design principles must be implemented 	<p>NEGATIVE LOW</p>
INDIRECT IMPACTS			
<p>No indirect impacts have been identified</p>			
CUMULATIVE IMPACTS			
<p>Municipal Infrastructure</p> <p>The extra pressure that this development could place on the existing municipal infrastructure for waste and sewage disposal as well as water provisions could be significant when seen together with other developments within the greater municipal area.</p>	<p>NEGATIVE MEDIUM</p>	<p>The availability of bulk water, sewer and electricity confirmed.</p>	
<p>Traffic</p> <p>The proposed development together with other developments in the region would have a significant impact on the current road network.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • Intersections which do not have sufficient spare capacity to accommodate the existing and future background traffic should be upgraded. • Bulk services to be extended as part of this development to accommodate further development in this area, in accordance with the SPLUMA master planning. 	
<p>Noise</p> <p>Noise pollution from vehicles, generators, noise associated with human habitation as well as domestic animals, dogs etc.</p>	<p>NEGATIVE MEDIUM</p>	<ul style="list-style-type: none"> • All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993). 	
<p>Cumulative Effect of Project on Terrestrial Ecology</p>	<p>NEGATIVE MEDIUM</p>		
<p>Cumulative Effect of Project on Aquatic ecology</p>	<p>NEGATIVE LOW</p>		
<p>Cumulative Effect of Project on Heritage</p> <p>Other authorised projects (e.g., residential developments) in the area could have a cumulative</p>	<p>NEGATIVE LOW</p>		

impact on the heritage landscape. The impact on physical heritage is low as no sites of significance will be impacted on by the new developments.			
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11 PUBLIC PARTICIPATION

Texture Environmental Consultants has taken cognisance of the requirements for public participation in terms of the 2014 EIA Regulations, as amended and has ensured that the public participation principles are upheld. A successful Public Participation Programme (PPP) is one that is inclusive, actively engages the public and provides ample opportunity for the public to participate in the process. This document provides an overview of the PPP undertaken as part of the BA process for the proposed project.

The purpose of the PPP is to ensure that the issues, inputs and concerns of Interested and Affected Parties (I&APs) are taken into account during the decision-making process. This requires the identification of I&APs (including authorities and the public), communication of the process and findings to these I&APs and the facilitation of their input and comment on the process and environmental impacts, including issues and alternatives that are to be investigated. The steps taken during the execution of the PPP undertaken for this project are detailed in the section that follows.

Refer to Comments and Response Report attached as *Appendix 5 (6)*.

11.1 Advertisement and Notice

Site notice position	Notice displayed at the site entrance
Date placed	07/02/2022
Publication name	Potchefstroom Herald
Date published	10/02/2022

(Refer to Appendix E(1a): Proof of site notices)

(Refer to Appendix E(1b): Proof of newspaper notice)

11.2 Public Notification

A consultation process was undertaken with the intent of informing key community stakeholders, comprising the Municipal structures and the local communities about the proposed development and the Basic Assessment process underway.

Identification of Interested and Affected Parties

The PPP for the project was initiated with the development of a comprehensive I&AP database. The list of I&APs was updated on a regular basis during the course of the project. Key stakeholders were identified at the beginning of the PPP, these included: Key stakeholders, commenting authorities and landowners/land users. Refer to Appendix 4(a): Register of Interested and Affected Parties for a complete list.

Background Information Document

- A comprehensive background information document (BID) was compiled with the main aim to identify issues, and potential impacts associated with this project. It included a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (I&APs). BID attached as Appendix E(2a).

- On 07/02/2022 the documentation was submitted for comment to all I&APs.
- The due date for comment was 09/03/2022. This allowed for a comment period of 30 days.
- Copies of the notification to I&APs are included as Appendix E(2b).

11.3 Distribution of Draft Basic Assessment Report for comment

Notification of the availability of the Draft Basic Assessment Report (DBAR) will be submitted to all I&APs. (Proof to be included as Appendix E(2c) of the final BAR).

The DBAR will be available for comment on the Setala website using a given link. The comment period will be for 30 days.

Copies of the DBAR will also be submitted to the following key stakeholders:

- The Department of Economic Development, Environment, Conservation and Tourism, North West Provincial Government
- JB Marks Local Municipality, Environmental Management Services
- Department of Water and Sanitation, Provincial Office: Gauteng /Vaal River Catchment Management Agency

(Proof included as Appendix E(2c) of the final BAR).

11.4 Comments and Response Report

The Public Participation Programme allowed for informed and responsible decision-making by all interested and affected parties. A summary of I&AP comments and the consultant's responses to these comments are provided in the Comments and Response Report. (The original I&AP comments are included in *Appendix E(3a)*). Refer to Comments and Response Report attached as *Appendix E(6)* for detailed information.

Notification Phase

List of authorities from whom comments have been received:

Eskom, North West OU Land Development.

Key stakeholders from whom comments have been received:

A. H. Freysen, Plot 362 Kanaal Road

Johan van Niekerk

Wilhelm Rost on behalf of NicJac Pieterse Boerdery

Philip Taylor

M. MA Roelofse

Ms. WVA Smith

11.5 Comments on Draft BAR

Comments received on the DBAR will be included as Appendix E(3b).

11.6 Conclusion Public Participation Programme

In short, the study approach followed by the Consultants, entailed the following steps:

Activity	Description and Purpose
Pre-Application	
Preparation of a preliminary stakeholder database	A preliminary database has been compiled of authorities (local and provincial), Non-Governmental Organisations, land users and other key stakeholders (refer to Appendix E(4a)). This database of registered I&APs will be maintained and updated during the ongoing BA process.
Preparation and Distribution of a Background Information Document (BID)	On 07/02/2022 BIDs and registration forms were distributed via email to all I&APs on the database. See Appendix E(2b) for proof of written submissions. The BID provides an introduction to the Project and the BA process. Due date for comment was 09/03/2022. See Appendix E(2a) for the BID and Registration form.
Advertisement of the Project and Erection of Site Notices	The Project was advertised on 10/23/2022 in the newspaper, Potchefstroom Herald. See proof of notice in Appendix E(1b). A Site notice has been placed at the site on 07/02/2021: See proof of placement in Appendix E(2a).
Development of an Initial Comments and Response Report	All comments received during the initial consultation period were recorded in a Comments and Responses Report. See included in Appendix E(6).
BA Phase	
Release of draft Basic Assessment Report for Public Comment	The draft BA Report will be released for the required 30-day public comment period: 24/07/2023 to 24/08/2023. (This constitutes 30 days). Notifications will be sent to all stakeholders on the database and included details of how to engage in providing comment. The report will be submitted to all I&APs and electronic copies could be downloaded with a link from the Setala website. Proof attached as Appendix E(2d).
Development of a Comments and Response Report	All comments received were recorded into a Comments and Response Report. See attached as Appendix E(6).
Public Open Day	Opportunity for engagements to replace the public meeting, to be held virtual via teams/zoom, telephone conversations, text messages etc. will be provided.
Submission of final Basic Assessment Report to Environmental Authority	Subsequently the final BAR will be submitted to DEDECT. The final BAR will include all concerns raised to the DBAR, and the responses thereto.
Environmental Decision	
Notification of Environmental Decision	I&APs will be notified of the Environmental Decision and the statutory appeal period.

12 ENVIRONMENTAL IMPACT STATEMENT

The findings conclude that there are no environmental fatal flaws that could prevent the proposed Baillie Park X 63 development if the recommended mitigation and management measures contained in the Draft BAR and EMPr (Appendix F) are implemented.

BIO-PHYSICAL ENVIRONMENT

Geology and Soil

The results of the geotechnical site investigation revealed the following:

- The soil-like overburden underlying the proposed development exhibits a fairly homogenous geotechnical character, with sub-surface conditions dominated by the presence of a significant thickness of slightly to moderately compressible, and slightly expansive soil-like overburden,
- A seasonal weak perched groundwater level is expected to occur at relatively shallow depth within the soil-like overburden, and could persist for a significant period after the rainy season,
- Occasional pockets where weathered bedrock occurs relatively close to the surface that could hamper excavation of service trenches by hand or light mechanical excavator,
- Highly localized areas exhibiting slopes of between 4.5 and 6°,

- The fairly homogenous geotechnical characteristics of the soil-like overburden allow classification of the whole stand as NHBRC Site Class S1/S2-H/H1-(R)-(p^{seepage}),
- The soil-like overburden is expected to be corrosive to steel.

Recommendations

It is recommended that a services-level geotechnical investigation (corresponding to a NHBRC Phase II investigation) be conducted during placement of bulk services within the proposed township in order to identify and assess localized sub-surface conditions at variance with that encountered during this investigation.

It is further recommended that a geo-professional inspect foundation and service trenches to identify and address sub-surface conditions at variance with that encountered during this investigation. Additionally, site-specific geotechnical investigations should be conducted.

Biodiversity

- According to the Biodiversity Impact Assessment Report the ecological sensitivity of the site is low.
- The study site is within the original extent of Rand Highveld Grassland. However, the study site has been cultivated and work over the years and there is no pristine or good condition highveld grassland ecosystem present on site. The vegetation is mostly altered with some areas that have been transformed.
- The veldtype / ecosystem is threatened with a status of 'Vulnerable'.
- There are no watercourses on site, including wetlands. The closest watercourse is the Loopspruit, which is more than 900 m southeast of the outer boundary of the site.
- The study site is not within any priority areas, including important birds areas (IBAs) and protected areas.
- The study site is not within any terrestrial CBAs or ESAs, but is within an aquatic ESA.
- No fauna or flora species of conservation concern (SCC) were observed on the study site.
- Site investigations were conducted during the summer (wet) season of the region and the findings and availability of field data is sufficient to reach acceptable findings and outcomes from the assessment.
- There are no obvious fatal flaws in terms of the natural environment.
- Taking all findings and recommendations into account it is the reasonable opinion of the author / specialist that the activity may be authorised. The project and related activities may proceed to the next phase.

Recommendations

- Recommended mitigating measures as proposed in this study and report should be implemented if the findings of this report are to remain pertinent.
- There is no need for any buffer zones.
- A site-specific rehabilitation plan, which must include a weed control plan, must be compiled for the project.
- A site-specific stormwater management plan must be compiled. This normally forms part of the engineering and architecture plans and designs.

SOCIO-ECONOMIC ENVIRONMENT

Cultural heritage sites and graves

According to the Heritage Specialist the project area is considered to be of low heritage significance and no heritage sites or features were identified during the survey.

The palaeontological sensitivity of the study area is moderate, and an independent assessment was done nearby (Bamford 2022) that concluded the area lies on the moderately fossiliferous Quaternary sands and alluvium that might have transported and fragmentary fossils. None has been reported from the area to date and it is extremely unlikely that any fossils would be preserved in the soils, sands and alluvium of the Quaternary. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.

No adverse impact to heritage resources is expected by the project and it is recommended that the project can commence on the condition that the recommendations in the Heritage Impact Assessment Report are implemented as part of the EMPr and based on approval from SAHRA.

Availability of civil and electrical services

Water: According to the civil engineers adequate bulk water, bulk water treatment and storage capacity for the proposed daily demand of the development is available. Although domestic water pressure can be low, adequate capacity can be made available to supply in the daily demand of the proposed development.

Sewer: The capacity of the Bulk Sewerage Treatment Plant of Potchefstroom has been upgraded to accommodate future development. The treatment works with a treatment capacity of 45Mℓ/day are currently utilized at 33 – 34 Mℓ/day with 34% available capacity.

The Bulk sewer line can be extended approximately 1170m to the Modderdam road reserve and then northwards past the Thandi street pumpstation (picking up the existing inflow from the eastern side – Saddlebrook) turning east in the service road up to the development.

According to the civil engineers this sewer line would be of adequate capacity to accommodate the intended development.

Electricity: No electrical capacity is available at this stage to supply the proposed township development with power.

The only option to the developer at this stage is to have a development totally off the electrical grid with Solar panels / Batteries and or Generators.

Cost of energy is rising, and the world is becoming more aware of the environmental impact of our energy sources and footprint. Our National energy provider is under severe pressure and all measures should be taken to incorporate alternative energy sources.

Stormwater: The topography of the site has a natural fall towards the Southern side. The storm water collected on the property can be accommodated on surface and fed into a piped system. Most of the stormwater collected on the property will drain naturally towards the Loopspruit approximately 960m south and eventually end up in the Mooiriver. Wayleaves is to be obtained for a piped drainage system from the lower laying parties with the appropriate servitudes to be registered.

Solid waste: Refuse removal is conducted by the J.B. Marks City Council. The additional refuse from the proposed development is minor in comparison to the existing refuse generated and can therefore be spoiled at the existing dumping site without difficulty.

Provision must be made for a dedicated closed off refuse area for cleaning and storage of bins.

The refuse can be collected and taken to the Municipal dumping site by a private refuse removal company as the J.B. Marks City Council don't have a refuse removal route available in this area.

Traffic Impacts

The proposed development would have a significant impact on the current road network due to the increase in traffic. The recommended access arrangements and road upgrades must be implemented.

Need and desirability

The need and desirability for the proposed development had been confirmed. The development site is ideally located within the Urban Edge in an area earmarked for residential development. The locality of the property is fitting with regards to the existing and planned residential developments/extensions in the surrounding area. The township also has higher accessibility and increased movement due to the locality to the existing and planned road network.

The proposed development will be similar as the well-known De Land lifestyle estate just on a smaller scale. It will mainly cater for the elderly and their families, seeing that provision is made for care facilities, guest facilities and community facilities. This unique development will thus ideally for people who want to stay near their parents but not in the same house or erf.

Socio-economic

The proposed Baillie Park X 63 development will create employment opportunities during both the construction and operational phase.

The development will lead to increased rates and taxes accruing to the JB Marks Local Municipality.

ALTERNATIVES

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental impact assessment process.

Layout Alternative (1) Proposal

Access to the site is available from the existing Kanaal Road which is to be upgraded and constructed for approximately 450m, to minimum 6m wide kerbed, paved road, from this development and to join up with the Modderdam road (D1208) to the west.

The existing entrance on the southern boundary will be moved westwards (*please refer to Layout Alternative 2*) and be utilized as a service/emergency entry via the existing road over Portion 14 of the farm Vyfhoek 428 IQ and to join up with the Modderdam road (D1208) to the west. Only limited traffic will occur on this road thereby mitigating the traffic impact on properties situated to the south of the proposed development.

Layout Alternative 1 provides a much larger Private Open Space Area (0,3387 ha) in the centre of the residential area in comparison with the Private Open Space Area of only 0,0666ha in the northern section of the residential area in Layout Alternative 2.

Layout Alternative 1 is regarded as the preferred alternative.

Layout Alternative 2

Access to the site is available from the existing Kanaal Road (to be upgraded) and the road on the southern border (to be upgraded).

The entrance in Kanaal Road will serve for the workers, guesthouse/care facilities and other community facilities such as the Pre-School, Restaurant and Social Hall that will be established on the Business and Institutional erven. The Southern Entrance will be the main entrance for the permanent residents living in the estate on erven 1- 45. The traffic generated by this entrance will have a significant impact on the residents to the south of the site and would require the upgrading of this road which would have an impact on surrounding residents.

In addition, Layout Alternative 2 provides a much smaller Private Open Space Area than Layout Alternative 1.

Layout Alternative 2 is not regarded as feasible and therefore it is recommended that Layout Alternative 1 be implemented.

Alternative 3: No-Go alternative

The no-go alternative will entail that the status quo will remain.

None of the advantages associated with the proposed residential development will realize should the no-go option be implemented. The no-go option is therefore not regarded as a viable alternative.

It is therefore proposed that Layout Alternative 1 is the preferred alternative to be implemented.

It is the opinion of Texture Environmental Consultants that there are presently no environmental impacts emanating from the proposed activity that cannot be adequately managed. The management of the negative impacts will require the implementation of the necessary mitigatory measures detailed in the EMPr (refer to Appendix F) of this report.

13 RECOMMENDATIONS

Based on the assumption that the mitigation measures will be effectively implemented for the proposed Baillie Park X 63 township development and associated infrastructure and that no fatal flaws have been identified to date, it is the opinion of the EAP that this activity should be authorised to proceed to the final stages of decision making.

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through practical measures, the recommendations from this DBAR are included within the EMPr (Appendix F).

The EMPr must be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for the life cycle phases of the project is considered to be vital in achieving the appropriate environmental management standards as detailed for this project.

The applicant must appoint a suitably experienced (independent) Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr.

The project may only proceed based on approval from SAHRA and the implementation of the following recommendation in the Heritage Impact Assessment:

- Implementation of the Chance Find Procedure for the project.

If granted, the environmental authorisation is required for a period of 10 years.

It is envisaged that the construction period will be concluded and post construction monitoring requirements will be finalised approximately five years after commencement of the activity. At present a commencement date has not been finalised.

14 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The assessment contained in this report as well as the recommendations made are based on the assumption that it does not replace or nullify any other spheres of legislation that may apply to any or all aspects of the proposed development.