Draft Environmental Impact Assessment Report

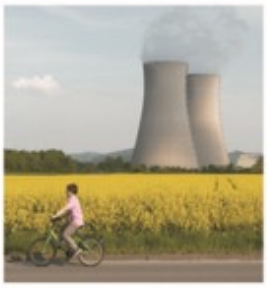
Proposed New Eersterus X 15 Township Establishment and associated infrastructure on a Portion of the Remainder of the farm Bultfontein 107 JR

Gaut: 002/22-23/E3308

February 2023


Applicant: Plastic Pack (Pty) Ltd
Contact person: Mr. R Streak
Tel: 082 573 0409
Email: urb-con@mweb.co.za

Submitted By: Texture Environmental (Pty) Ltd
44 Melrose Blvd, Melrose Arch, Johannesburg
Contact Person: Mientjie Coetzee
Tel: 083 253 2246
Email: mientjie@peopletexture.co.za





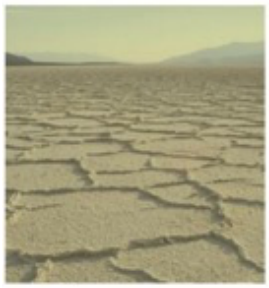




Table of Contents

FIGURES

TABLES

APPENDICES

Appendix A: Details of EAP and expertise
Appendix B: Site Layout Plans
Appendix C: Specialist reports
Appendix C1: Infrastructure Services Report
Appendix C2: Stormwater System Report
Appendix C3: Traffic Impact Study
Appendix C4: Geotechnical Report
Appendix C5: Ecological Habitat Survey
Appendix C6: Riparian and Wetland Assessment
Appendix C7: Heritage Impact Assessment
Appendix D: Comments on Township Establishment Application
Appendix E: Comments: The acting Group Head: Human Settlements Department, City of Tshwane Metropolitan Municipality
Appendix F: Environmental Management Programme (EMPr)
Appendix G (i): Proof of notification of I&APs
Appendix G (ii): Proof of submission to City of Tshwane Metropolitan Municipality, Environmental Management Planning & Open Space Management
Appendix G (iii): Proof of submission to Councilor JJ Coetzee, Ward 96
Appendix G (iv): Proof of submission to DWS
Appendix G (v): Proof of submission of notices to Dali Mphofu View informal settlement
Appendix G (vi) Proof on Notice Board
Appendix G (vii): Proof of publication in Gauteng Provincial Government Gazette
Appendix G (viii): Comments and responses from I&APs
Appendix G (ix): Distribution of Draft SR to I&APs
Appendix G (x): Comments from CoT Environment & Agriculture Management Department, Environmental Planning & Open Space Management Section
Appendix G (xi): Comments and responses on Draft SR from I &APs
Appendix G (xii): Attendance Register: Meeting with Chairperson Dali Mphofu View
Appendix G (xiii): Register of I&APs
Appendix G (xiv): Proof of notification of I&APs Draft EIAR available for review
Appendix G (xv): Proof of notification of CoT, Environmental Management Division Draft EIAR available for review
Appendix G (xvi): Proof of notification of DWS Draft EIAR available for review
Appendix G (xiv): Proof of notification of SAHRA Draft EIAR available for review
Appendix H: Correspondence Land Claims Commissioner
Appendix I: Correspondence Christina Seegers

ACRONYMS

AEL	Atmospheric Emissions License
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme

ESA	Ecological Support Area
FSR	Final Scoping Report
GDARD	Gauteng Department of Agriculture and Rural Development
IDP	Integrated Development Plan
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
LUDS	Land Use Development Support
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEMAQA	National Environment Management: Air Quality Act (No.39 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act (Act 36 of 1998)
PES	Present Ecological State
PIA	Palaeontological Impact Assessment
PPP	Public Participation Process
PoS	EIA Plan of Study for Environmental Impact Assessment
SDF	Spatial Development Framework
SR	Scoping Report
SAHRA	South African Heritage Resources Agency

GLOSSARY OF TERMS

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

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.

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 organisations, 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. This 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.

Indirect impacts – indirect or induced changes that may occur as a result of the activity. These types if 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 – in relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the 2014 EIA Regulations.

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 addresses 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 judgments 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.

1 INTRODUCTION

1.1 Background

In order to address specific developmental needs in the City of Tshwane's area of jurisdiction, **Plastic Pack (Pty) Ltd** (the applicant) is planning a residential mixed use Mega City Township to be known as **New Eersterus X 15** on a portion of the Remainder of the farm Bultfontein 107 JR, City of Tshwane, Gauteng Province. The proposed development will consist of the following land use areas: Residential 1, Residential 3, Residential 4, Business 2, Institutional, including Hospital, Educational, Industrial, Municipal, Public Open Space and Provincial Roads and Access Roads.

The previous Environmental Assessment Practitioner (EAP) on the project, Mr. Cappie Linde (Envirovision Consulting), got seriously ill in September 2021 and could not continue with his work from October 2021 onwards. He since passed away and Texture Environmental Consultants was appointed to continue with the EIA Application process. Previous reference number: Gaut: 002/19-20/E2481.

The continuation of the EIA process entailed the resubmission of the Final Scoping Report to Gauteng Department of Agriculture and Rural Development (GDARD). The Final Scoping Report submitted by Texture Environmental was accepted by GDARD on 15 December 2022.

1.2 Approach to the Environmental Impact Assessment Process

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 Scoping EIA Process.

GDARD is the lead authority for this Environmental Impact Assessment (EIA) process and the development needs to be authorised by this Department in accordance with the National Environmental Management Act 107 of 1998 (NEMA) (as amended).

The required environmental process to be followed is being undertaken in two phases:

- Phase 1: Scoping Phase (Completed)
  Scoping Report (SR) including Plan of Study for EIA
- Phase 2: EIA Phase
  Environmental Impact Assessment Report (EIAR) and Environmental Management Programme (EMPr)

1.2.1 Scoping Phase (Completed)

The SR provided a description of the receiving environment and how the environment may be affected by the proposed development. Desktop studies making use of existing information were used to highlight and assist in the identification of potential significant impacts (both biophysical and social) associated with the proposed project.

Additional issues for consideration were extracted from feedback from the public participation process, which commenced at the beginning of the Scoping Phase, and will continue throughout the duration of

the project. All issues identified during this phase of the study were documented within the SR. Thus, the SR provided a record of all issues identified as well as any fatal flaws, in order to make recommendations regarding the project and further studies required to be undertaken within the EIA phase of the proposed project.

The Final Scoping Report (FSR) was accepted by GDARD on 15 December 2022. The letter of acceptance authorised the applicant to proceed with undertaking the EIA for the proposed township development, in accordance with the tasks outlined in the Plan of Study for Environmental Impact Assessment. Specific additional conditions were listed in the acceptance letter.

GDARD requested the following information to be addressed in detail in the EIA Phase of the project:

1) The EIAR must comply with Regulation 23 of the Environmental Impact Regulations (EIAR), 2014 as amended.

   Response: Noted.

2) All planned specialist studies must be undertaken by qualified specialist and must comply with GDARD Requirements for Biodiversity Assessments and signed off by specialist registered with South African Council for Natural Scientific Professions (SACNAPS).

   Response: Noted.

3) The proposed layout plan with the following recommendations to be included in the draft EIAR:
   - ➢ The report must contain a layout plan overlaid with sensitivity map and such map must be created in accordance with GDARD Minimum Requirements for Biodiversity Assessments.
   - ➢ The proposed layout plan does not consider the sensitivity map and assessment presence of wetland at the site as indicated under Wetland and Riparian Assessment.
   - ➢ The layout plan must consider the presence of non-perennial rivers and artificial waterbodies.
   - ➢ The layout plan must indicate the footprint development and indicate the buffer zones if the footprint development will be within or outside buffer from the proposed site development.
   - ➢ The Catchment and Runoff layout plan is not true reflection to the assessment presence of wetland as indicated under Wetland and Riparian Assessment. Therefore, the two layout plans and other assessment layout plans must not contradict to each other.
   - ➢ The layout plan must be to scale, clear, legible and indicate legend which corresponds with activity components.
   - ➢ An overall layout plan that shows all proposed development in one layout plan must be attached.
   - ➢ In the layout plan, it must indicate all existing or/and required servitudes within the proposed footprint development.

   Response: Refer to Figure 3 and Appendix B for Layout Plan in line with GDARD requirements.

4) Comments from City of Tshwane Metropolitan Municipality Department of Environmental Management Resource and other related division must form part of the Draft EIAR (DEIAR).

Response: Refer to Appendix G(x) for comments on the Draft Scoping Report. The DEIAR was submitted to City of Tshwane Metropolitan Municipality Department of Environmental Management Resource for comments. Comments received on the DEIAR will be included in the Final EIAR.

5) A confirmation from City of Tshwane Metropolitan Municipality with regards to provision of bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructures is required. This must include a description of the infrastructure, specifications, layout, capacity and the planned routes. This must form part of the draft EIAR.

Response:
In comments on the Township Establishment application from Water and Sanitation (Region B), City of Tshwane (CoT), it is confirmed that the site has existing water services available in the vicinity. The onus rests with the Professional Consulting Civil Engineer appointed by the Developer, to determine and confirm that the available municipal water supply is sufficient for the proposed development. All link water networks required to connect the proposed new services to the existing municipal network will be constructed to the satisfaction of the CoT, at the expense of the Developer.

With regards to sewer it is stated that the Priority Area with respect to sewerage is determined and defined as any area within 100m from an existing municipal sewer that has the capacity to accommodate the proposed development. Any proposed development lying beyond this area will automatically be regarded as "leapfrog" development. The onus rests with the Developer's Consulting Civil Engineers to determine whether the proposed development can be sewer under gravitation. The Developer's Consulting Civil Engineers must also submit proof that the existing municipal sewer, to which the proposed development may connect, can accommodate the additional flow. Refer to Appendix D for Correspondence.

6) The final Scoping Report has public participation process, please note that a full public participation process should be undertaken in accordance with Regulation 41. In terms of a transparent and inclusive public participation process the interested and affected parties, particularly relevant authorities and other institutions which in terms of their mandates are legally required to comment on the proposed development, should be informed and given an opportunity to comment on the proposal. All evidence of the Public Participation Process being undertaken must be included in the draft EIAR.

Response: Refer to Section 8.2 and Appendix G for details and evidence of the Public Participation Process undertaken during the EIA phase.

7) All comments received from relevant Authorities on specialist studies must be submitted as part of the draft EIAR.

Response: All comments received on specialist studies included in the DEIAR will be included in the Final EIAR.

8) The EMPr must form part of the Draft EIAR.

Response: Noted, EMPr included as Appendix F.

9) The proposed township development falls within a sensitive area as per C-Plan Version 3.3. The Department has noted that this application for Environmental Authorisation is still on the scoping stage. However, all mitigation measures to lessen damage to sensitive environment especially to non-perennial river and artificial dams must be clearly stated in the draft EIAR.

   Response: Refer to Section 9.3 and EMPr (Appendix F).

10) Comparative assessment of all alternatives taking into consideration, the sensitive areas on the site, surrounding land uses, nature and scale of activity components must be done and outcomes reported in the draft EIAR.

    Response: Refer to Sections 7 and 9.4.

11) A credible method of impact assessment, impact identification, rating and mitigation must be used to determine the impact of the proposed development on the biophysical environment on the site.

    Response: Refer to Section 9.

1.2.2 Environmental Impact Assessment Phase

The EIAR has aimed to achieve the following:

- to provide an overall assessment of the biophysical and social environments of the affected area;
- to undertake a detailed assessment of the preferred site/alternatives in terms of environmental criteria including the rating of significant impacts;
- to identify and recommend appropriate mitigation measures (to be included in an EMPr) for potentially significant environmental impacts; and
- to undertake a fully inclusive public participation process to ensure that I&AP issues and concerns are recorded and commented on and addressed in the EIA process.

1.3 Content and Structure of the EIA Report

This report represents the Draft EIAR and was compiled in accordance with Government Notice No. R. 326 of 7 April 2017, Appendix 2(1). In terms of Government Notice No. R. 326 of 7 April 2017, Appendix 2(1) an EIAR must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—

(a) details of—

- the EAP who prepared the report; and
- the expertise of the EAP, including a curriculum vitae;

(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:

- the 21 digit Surveyor General code of each cadastral land parcel;
- where available, the physical address and farm name; and
- where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is—

- 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;

(d) 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 associated structures and infrastructure related to the development;

(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;

(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;

(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;

(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:
- details of the development footprint 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 development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- the impacts and risks identified 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; and
  - 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;
- positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- the possible mitigation measures that could be applied and level of residual risk;
- if no alternative development footprints for the activity were investigated, the motivation for not considering such; and
- a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;

(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including—
- 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;

(j) 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;

(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;

(l)an environmental impact statement which contains—

- a summary of the key findings of the environmental impact assessment:
- a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and
- a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;

(s) 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;

(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;

(u) an indication of any deviation from the approved scoping report, including the plan of study, including–

- any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and
- a motivation for the deviation;

(v) any specific information that may be required by the competent authority; and

(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.

This report has been structured to comply with the format required by the NEMA. The contents are as follows:

TABLE 1: REPORT STRUCTURE

SECTION	CONTENT
SECTION 1 Introduction	Introduction and background to the project.
SECTION 2 Details of EAP	Presents information regarding the EAP involved in the proposed project.
SECTION 3 Locality and nature of the project	Provides detailed information regarding the proposed project and associated required infrastructure.
SECTION 4 Project motivation	Presents the need and desirability of the proposed project.
SECTION 5 Legal framework	Includes an explanation on all applicable legislation.
SECTION 6 Receiving environment	Provides the baseline information of the biophysical and social environments being impacted by the development proposal. Key findings of the specialist studies conducted.
SECTION 7 Project Alternatives	Consideration of alternatives (locality, land use, layout, designs, energy uses and No-Go) for the project.
SECTION 8 Public participation process	Provides an overview of the Public Participation Process conducted to date.
SECTION 9 Environmental Impact Assessment	The impacts identified are rated by significance.
SECTION 10 Environmental Impact Statement	Conclusions and recommendations of the Environmental Impact Assessment.

2 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1 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.

2.2 Details of the expertise of relevant Environmental Assessment Practitioner

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 Licence Applications, Integrated Water and Waste Management Plans, water use, and water quality assessments.

Refer to Table 2 and Appendix A for EAP details and experience.

TABLE 2: EAP DETAILS AND EXPERIENCE

Company	Texture Environmental Consultants
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 more than 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.

3 LOCALITY AND NATURE OF ACTIVITY

3.1 Project Locality and Extent

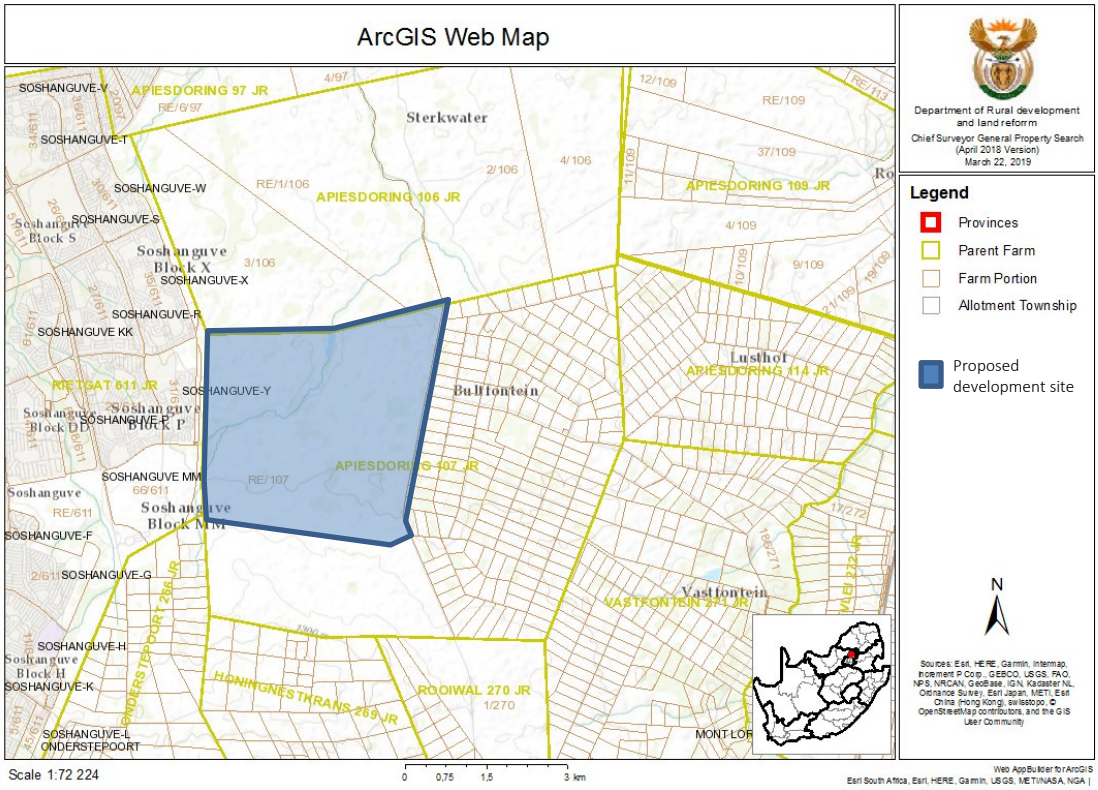


Figure 1: Locality Map

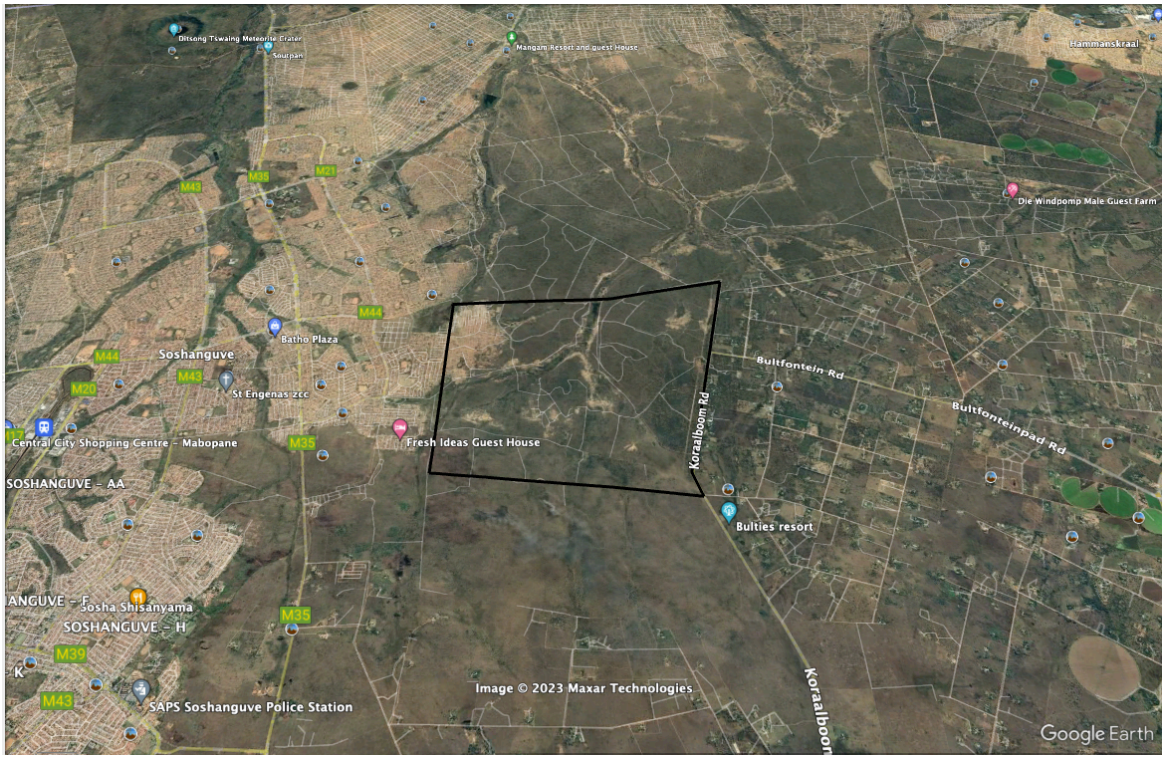


Figure 2: Aerial Map

21 Digit Surveyor General code

T0JR00000000010700000

Physical address and farm name

The Remainder of the farm Bultfontein 107 JR.

Coordinates of the centre of the activity (Hartebeesthoek 94, WGS84)

25°28'47.45" South;
28°09'40.83" East.

The site is located in the northern Development region of Tshwane, East of the R80 Mabopane Highway and the proposed PWV 9 Road - Region 2 (the proposed PWV 9 road to the north forms the western boundary of the township).

The proposed township development area is located directly on the eastern border of proclaimed developed townships of Soshanguve Block MM, X and Y.

The site is located in an area that is and will experience huge pressure for development growth, especially from the Soshanguve side which is located on western side of the proposed township and has been identified as a priority area for Tshwane Human Settlements.

The site is approximately 1190 ha in extent.

Access to the site will be obtained from from the existing Bultfontein Road on the eastern boundary. Access to the township can also be taken from the western side from the existing Soshanguve Townships.

3.2 Description of activity[1]

The proposed development to be known as New Eersterust X 15 and future extensions will comprise the following land uses (refer to Figure 3 and Appendix B for the proposed Layout Plan):

Use Zone	No. of erven	Area (Ha)
Residential 1 (1 unit /erf) (180 – 300sqm)	15 781	408
Residential 3 (40u/ha)	40	41.84
Residential 4 (100u/ha)	12	46.21
Business 2	9	30.97
Institutional (including Hospital)	12	18.89
Educational (schools, pre- schools)	11	69.12
Industrial 2	17	58.9
Municipal	1	5.4
Public open space	41	160
Total	15 952	839.33

[1] Information obtained from Township Establishment Memorandum compiled by Urban Consult, November 2019.

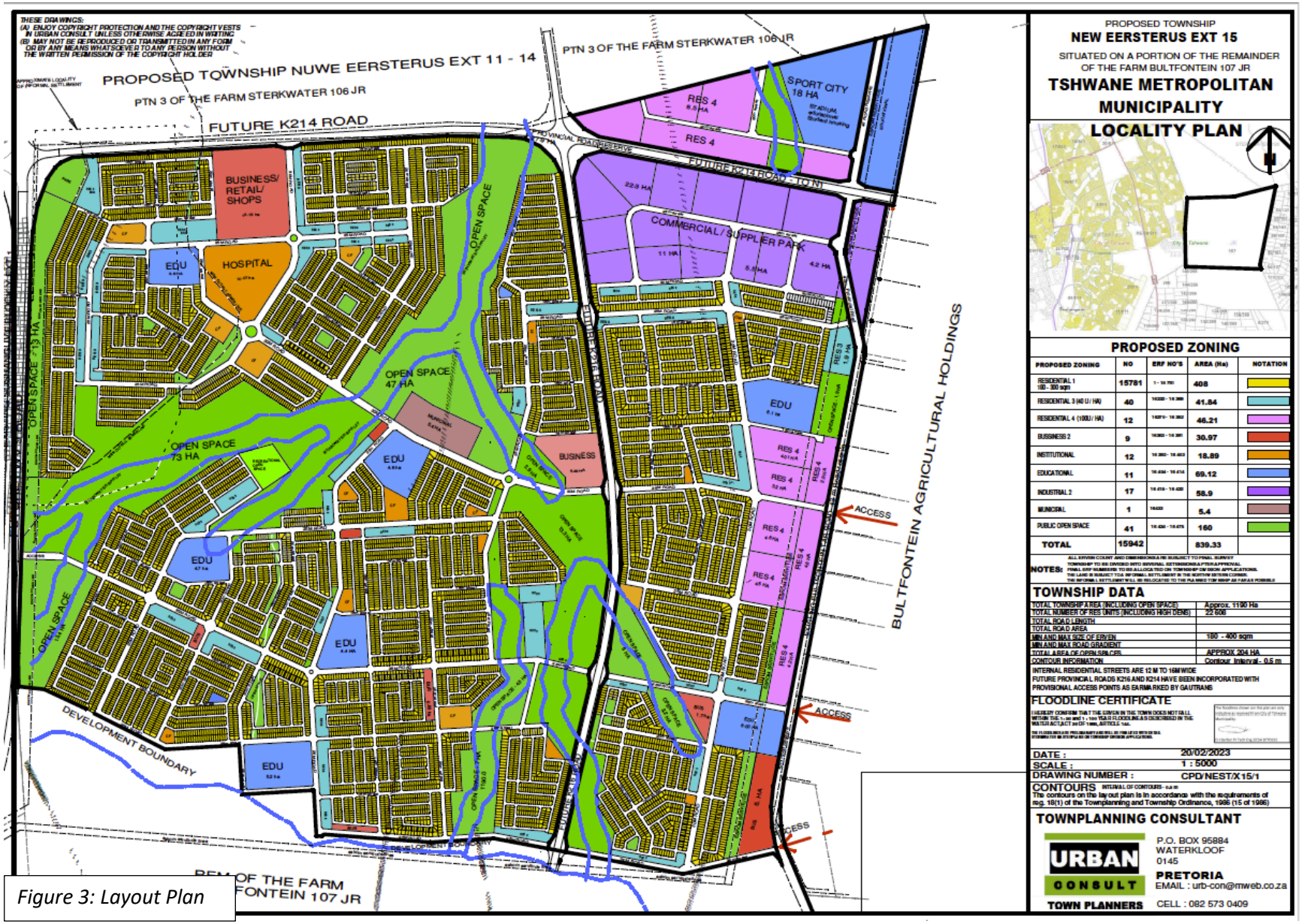


Figure 3: Layout Plan

3.3 Proposed Road Structure

The City of New Eersterust X 15 has been planned to take into consideration the existing and planned Provincial and Municipal Road infrastructure, continuing existing roads where necessary and discussed already with city of Tshwane Road Master Planning section.

3.3.1 Provincial Roads

The K214 Road (Northern boundary), K216 North / South link and proposed PWV9, along the western boundary of the site and parallel to proposed K216 affects the site.

The development will gain access from the existing Bultfontein Road on the eastern boundary. Access to the township can also be taken from the western side from the existing Soshanguve Townships.

3.3.2 Internal Roads

The internal street hierarchy for the development can be classified into 3 classes:

- Class 3 arterial roads 20, 25 and 30m road reserves providing access to the Provincial Roads and will be the primary bus and taxi routes in the township.
- Class 4 access roads in 12/13m and 16m reserves provides access to residential neighbourhoods
- Class 5b residential access streets in 12 m street reserves.

Community and social facilities are located at the intersections of the main arterials with other arterials (possible public transport routes) to facilitate ease of access for the community who will be using the facilities. Public Transport Facilities are located along the 25m and 30m access roads into the development. Class 4 access roads (16m road reserve) have been provided as access roads into the various development blocks and in some cases forms possible bus routes.

12/13m reserves were provided to allow access to the individual erven.

3.4 Proposed Urban Design and Layout

The layout of the proposed township was influenced by the following factors:

- Existing/ future Roads and access: PWV 9, Bultfontein Road, K214 and K216
- Tshwane Roads masterplan,
- Topographical features on the site
- Environmental Sensitivities on the site
- The Urban edge
- Government policies on fast tracking and delivery of housing
- Socio economic need in the area
- The pioneering effect of the proposed township

3.4.1 Road Layout

The internal road system has been designed as access collectors and 12/13m residential streets.
The Tshwane Roads masterplan road positions and widths have been respected.

All access points to the proposed township were designed with the requirements of Gautrans intersection spacing, traffic impact inputs from Traffic engineers. Roads going through the township according to the Tshwane Roads Masterplan (being updated) were indicated to link up with the major provincial roads for future access and development.

3.4.2 Residential Layout

Residential Component

With reference to the layout plan, the design philosophy is to provide for a mixed of income groups. The internal design of the erf blocks could accommodate modern Residential houses of 2 storeys on erven with an average size of 180 to 300 sqm. There are areas east of the proposed K216 that could be earmarked for middle income bonded houses as the average site size are a little bigger for this section (250 – 300sqm). It should however be noted that the size of the erven does not dictate the development requirements of any future residential unit and the planning does not discriminate on different level of income areas. Circulation in the township is good and will contribute to a safe and convenient environment.

The total development could accommodate a residential unit count of around approximately 22 608 units of which a total of 15 781 is single residential erven. This is currently the largest planned Mega Township in Gauteng.

The development as planned could provide bonded, FLISP and subsidised stands and units in at a level that is affordable for people in the "gap market". The project can also provide serviced site and land that will give effect to the fast-track land development principle being rolled out by Gauteng Province. The development will cater for bonded housing for middle income groups, lower earning income group and subsidised market making it a fully integrated development in line with the BNG principles, principles of the National Development Plan and principles of the Spatial Planning and Land Use Management Act.

A total of 15 781 single residential erven and 6294 residential units could be provided as planned and are made up of the following components:

- 15 781 erven zoned "Residential 1" (180 – 300 m^2);
- 40 erven zoned "Residential 3" (BNG multi story units / 40u/ha);
- 12 erven zoned "Residential 4" (Social Housing units / 100u/ha);

In order to comply with the integrated planning approach and accommodate different types of income levels, the proposed layout plan makes provision for various types of residential homes/units at varying densities as can be seen above.

3.4.3 Supportive Land Uses

With the layout plan Urban Consult is trying to create a sustainable residential environment satisfying the housing and other social needs of the target community for a mega development. The layout plan for the larger site makes provision for a total of 22 608 residential units. These residential erven comprise of stands at different densities. Care was taken to ensure that all supportive land uses (over the larger area) are accessible through those roads planned for public transportation and overall accessibility and are mostly located at nodes within the development.

Business

The layout provides for 1 stand for a large Regional business centre (13 ha) and stands zoned "Business 2" for shops, local small entrepreneurs and convenient small retail through the different planned areas to provide local shopping facilities for the community living in proposed township.

Industrial

The layout provides for a 58 ha area zoned "Industrial 2". This area could be developed in future to not only support manufacturing in the local area but to link up with the Automotive industry in Rosslyn for supplier and commercial manufacturing. A development area of this size needs to be planned in such a way to accommodate these zoning which will contribute to major employment creators.

Community Facilities

The layout provides for 11 stands (9ha) for community facilities or clusters of community facilities which could be used as churches, crèches, multi-purpose centres or any other community use depending on the need in the community. 7 Schools sites and 1 Combined Sport City and Educational Cluster site have also been provided for use by the future residents and students.

Hospital

The layout provides for 1 large site (10ha) for the future benefit of a hospital and associated medical uses.

The communities in the North of Pretoria are very large and access to primary health is very limited. This site could enhance the accessibility to medical treatment.

Municipal

The layout provides for 1 large erf zoned Municipal which will accommodate municipal services facilities and administration (etc accounts, infrastructure fault report, licensing, payment of services charges, rate queries, etc). Taking it into account that the area could add a future 22600 units to its rates income bill, the City of Tshwane would tremendously benefit of bringing the “municipality” closer to its people.

Transportation

The layout provides for a number of places which will accommodate public transport facilities such as a taxi ranking facility. This is located along central roads through the development and at the nodes within the development. The placement of the public transport facilities was done with visibility and legibility in mind.

Public transport lay by’s are accommodated in the road reserves.

Public Open Space

Large pockets of land zoned Public Open Space were provided to accommodate the areas which are affected by the most important drainage features. Some parks also accommodate services and powerlines but form an important part of the layout as it links the various pockets of open space to each other. Smaller internal parks were provided for the use of residents in each “development pocket”.

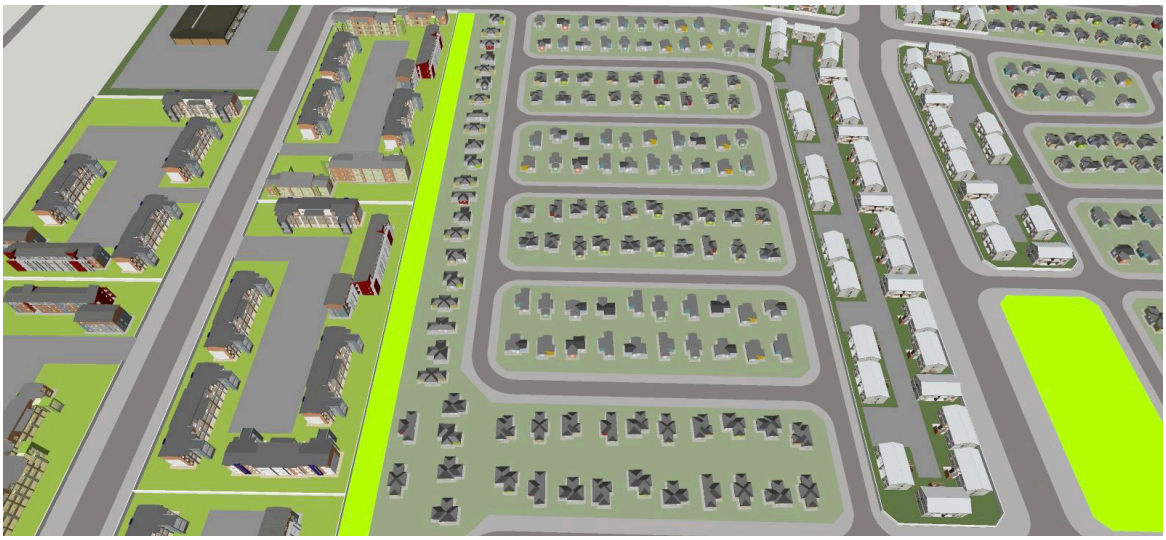


Figure 4: Typical example of the proposed development

3.4.4 Phasing

Due to the enormous scale of the development, it is proposed that after the initial township approval (when granted), an application for the division of the township into several phases or extensions will be done.

This is necessary to facilitate the provision of infrastructure as well as the implementation of such a large-scale project. It is however of critical importance that the overall development be approved over the total scope of the project as to secure the development rights for the next years to come.

A proposed erf count of around 2500 / phase could be achievable which in turn will provide for 7 extensions.

3.4.5 Civil Services and Infrastructure

Encotech Consulting Engineers & Project Managers compiled a high level Infrastructure Service Report on the impact and availability of existing and new bulk services (refer to Appendix C1). The report has also been sent to GLS for input. The GLS report has however been re-looked at and better recommendations to the implementation of the project were made.

A phased approach towards services provisioning is being proposed in order to provide access to residential erven as fast as possible whilst utilizing available services and available access as far as possible.

- North Western Quadrant (approximately 6500 dwelling units).
- South Western Quadrant (approximately 7000 dwelling units).
- North Eastern Quadrant (approximately 7500 dwelling units).
- South Eastern Quadrant (approximately 7000 dwelling units).

The different phases were decided upon based on the following considerations:

- Available bulk wet services that could be accessed/utilized.
- Drainage areas and catchments.
- Existing access routes.
- Future access and road authorities.

- Costs of bulk services.

In order to follow the sequence of development phases outlined above, the following bulk infrastructure is proposed:

Phase 1: North Western Quadrant

Water supply is to be provided by establishing a main feeder inlet pipe 800 mm dia from the Soshanguve DD Reservoir to the Bultfontein reservoir. A new 8 Ml reservoir (Bultfontein 1) as proposed wherefrom a main feeder outlet pipe 700mm dia/450mm dia will be constructed to Phase 1, traversing Phase 2.

Sewerage is to be provided by establishing a parallel sewer to the existing Rietgat outfall sewer from the northern boundary of Phase 1 to the Rietgat WWTW. This sewer (approximately 12.3 km, 0.6m dia @ average grade 1:400) is to cater for the entire flow from the Bultfontein Development. A sewage pump station is to be provided (Bultfontein Sewage 1 with capacity of 100l/s, to be upgraded in future) north of Phase 4 with rising main (355mm dia) to the Rietgat Outfall sewer. An outfall sewer (350/400 mm dia) is to be provided to the Bultfontein Sewage 1 pumping station. The existing Rietgat WWTW is to be upgraded with a 7.5 Ml ADWF unit.

Stormwater is to be provided by establishing a main stormwater discharge (for 1:20 Year flood) to the Stinkwater Spruit (underground pipe preferred).

Roads & Access is to be provided by constructing an extension to the Bultfontein Road, northwards to meet Road K214 (7.4 m wide travelled way 700m length). A single carriageway east/west on K214 alignment (7.4 m wide travelled way 2700m length) is to be constructed.

Phase 2: South Western Quadrant

Water supply is to be established by connecting to a bulk feeder pipe laid under Phase 1. Capacity is to be provided in the internal network for in the internal network for Phases 3 and 4.

Sewerage is to be provided by establishing approximately 1.3 km outfall sewer (355 mm dia to meet 400mm dia section laid under Phase 1) to Bultfontein Sewage 1 pumping station (the latter to be provided under Phase 1).

Stormwater will be collected by a 1:20 Year flood drain that drains directly to Stinkwater Spruit and its tributaries.

Access will be obtained by establishing the eastern section of the East/West Link Road (7.4 m travelled way 2000m long)

Phase 3: North Eastern Quadrant

Water supply is to be provided by constructing a second Bultfontein Reservoir (8Ml, Bultfontein 2).

Sewerage is to be provided by establishing an outfall sewer (355 mm dia 0.5km) to the Bultfontein Sewage 1 pumping station. The Bultfontein Sewage 1 pumping station is to be upgraded to receive sewage from Phases 3 and 4 and a second rising main (350mm dia) is to be provided to the Rietgat parallel sewer. Capacity is to be provided for in internal collection system for Phase 4. The Rietgat WWTW is to be additionally upgraded with a 7.5 Ml ADWF unit.

Stormwater will be collected by a 1:20 Year flood drain that drains directly to Stinkwater Spruit and its tributaries.

Roads & Access is to be provided by Road K214 provided under Phase 1.

Phase 4: South Eastern Quadrant

Water supply is to be supplied from Phase 2. No new pipes are required.

Sewerage is to be provided by connecting to the Phase 3 internal collection system.

Stormwater will be collected by a 1:20 Year flood drain that drains directly to Stinkwater Spruit and its tributaries.

Roads & Access will be obtained off the existing Bultfontein Road – possible access improvement may be required.

Implications for the development

Water supply network

The capacity to supply and upgrade major water infrastructure to the development has been confirmed by the consultants responsible for the master planning for the City of Tshwane (GLS Engineers). The distribution of the water to the proposed development will be a bulk supply cost for the developer due to the approximately supply line and infrastructure that needs to be installed for the development. This will however be done in several stages and over a period of years to come. It is however crucial in the planning for the next 10 years to give attention to the budgeting requirements.

This future planning and phased approach confirmation by the Engineers will open up the area as indicated in the Urban edge for development in future. Below is the schematic bulk supply line positions and details as discussed with GLS and the engineering reports. The bulk report indicated all preliminary cost and related detail.

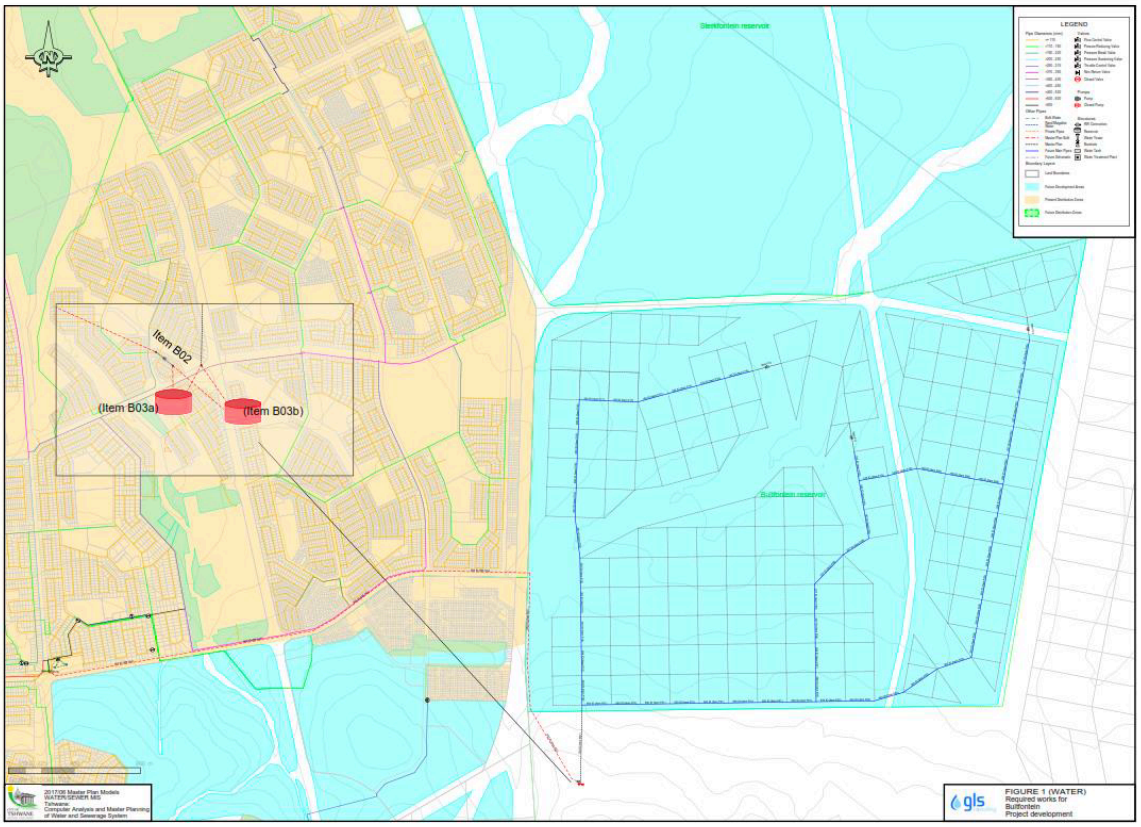


Figure 5: Bulk Water Distribution

Sewer supply network

Bulk sewer for the proposed mega township is very complicated at present and different scenarios need to be looked at in the bigger scheme. The consultants GLS Engineers as well as Encotech Engineers have looked at various options and recommendations and this need to be finalized on submission and implementation when a fist phase or extension is to be developed in the next 18 months or so. Figure 6 below indicates the sewer impact plan and installations that need to be done for the total development in the next 10-15 years.

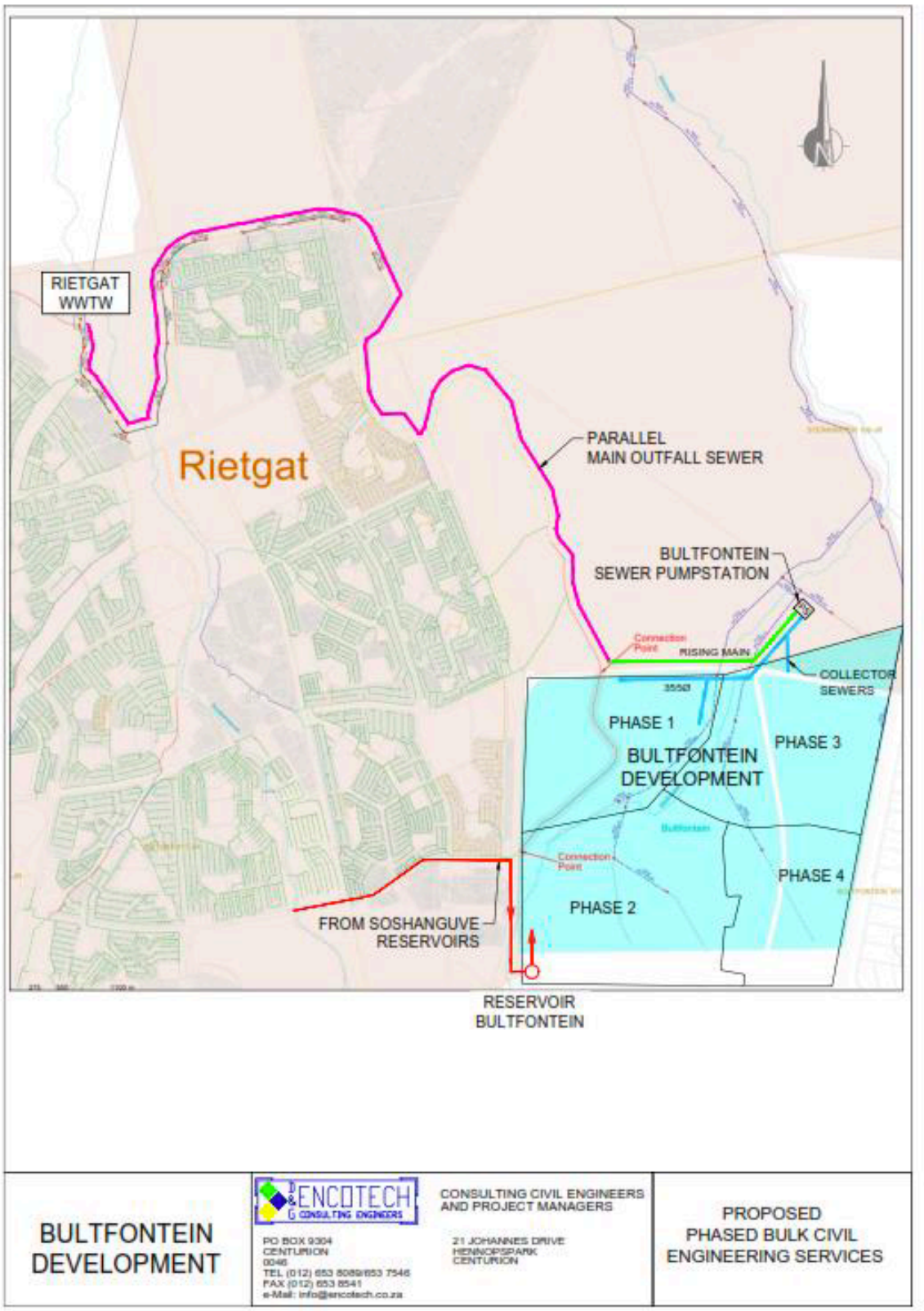


Figure 6: Sewer Impact Plan

In comments on the Township Establishment application from Water and Sanitation (Region B), CoT, it is confirmed that the site has existing water services available in the vicinity. The onus rests with the Professional Consulting Civil Engineer appointed by the Developer, to determine and confirm that the available municipal water supply is sufficient for the proposed development. All link water networks

required to connect the proposed new services to the existing municipal network will be constructed to the satisfaction of the CoT, at the expense of the Developer.

With regards to sewer it is stated that the Priority Area with respect to sewerage is determined and defined as any area within 100m from an existing municipal sewer that has the capacity to accommodate the proposed development. Any proposed development lying beyond this area will automatically be regarded as "leapfrog" development. The onus rests with the Developer's Consulting Civil Engineers to determine whether the proposed development can be sewer under gravitation. The Developer's Consulting Civil Engineers must also submit proof that the existing municipal sewer, to which the proposed development may connect, can accommodate the additional flow. *Refer to Appendix D for Correspondence.*

3.4.6 Stormwater Management

Encotech Consulting Engineers compiled a Stormwater run-off calculation and proposed Stormwater System Report in 2022 (refer to Appendix C2).

Site characteristics

The site drains naturally from south to north. A large area of farmland on the southern side of the of the proposed development forms part of the catchment area.

The geology of the catchment area allows for very high permeability soil (weathered granite) with low run-off coefficient but with a horizontal flow of water on the ferriccrete and solid granite sub surface areas with the well know high water table in certain areas during the peak rainy season. A further indication of the soil conditions is the small channel area at the centre of streams and the disappearance of the channel in total in certain areas.

The approach followed with the proposed stormwater system is also to allow for adequate subsurface drains in the stormwater reticulation system to prevent the forming of an un-foreseen high water table near any building.

Catchment areas and stormwater run-off calculations

The catchment areas and the summary calculation tables are indicated on the Annexure 3 of the Stormwater run-off calculation and proposed Stormwater System Report. The catchment areas and stormwater run-off for the 1:2 year & 1:20 year flood is indicated on the layout drawing attached as Annexure 4 of the above-mentioned report.

The following methodology was applied:

- The un-developed catchment areas to the south of the proposed developments (A1, B1, B3, D1, F1 & G1) were all taken as developed areas for the run-off calculation.
- The 1:20 year run-off from these catchments were used to calculate the pipe sizes running through New Eersterus Ext 15.
- All outlet pipe sizes to a stream or river were based on the 1:20 year flood .

Sub-surface drains

The areas where sub-surface drains are to be installed is shown on Annexure 5 of the above-mentioned report. With the future submission of the complete SIA report with the Services Report a more detail analysis of the drainage will be included. The detail design will allow for draining the sub-surface drains into the stormwater reticulation system.

Floodlines

The development is influenced by the 1:50 year & 1:100 year floodlines. There are two (2) specific areas where augmentation to the normal scenario is required (refer to Annexure 4 of above-mentioned report):

a) The natural stream from catchment D1 disappears on the catchment areas D2, D3 & E3. This is like a micro Okavango Delta. The run-off in the stream will be collected on the northern side of catchment D2 but a cut-off wall with adequate subsurface drainage capacity will be install in catchments D2, D3 & E3 to prevent the ground water to raise the water table during the rainy season.

b) At the north-eastern corner of catchment E4 the natural channel (omissible catchment area) runs over the corner of this area. A small attenuation pond will be allowed for on the open area to the east of catchment E4 and the outflow drained into the stormwater reticulation system. Sub-surface drainage will also be installed on the open area.

Summary

The proposed development lies on a geological area where the weather top material is highly permeable but the deeper solid layers mostly impermeable with the high water table emerging at shallow bedrock conditions during the rainy season. After good rainfall (80 mm or more) over a day or two, when the soil is already saturated and then followed with a dry spell afterwards, it normally takes a week or two for the surface seepage water to no longer run on the surface.

The proposed development can be successfully developed from a stormwater run-off and handling perspective as long as the precautionary measures are implemented in the detail design.

3.4.7 Traffic Impact Assessment Report

A high-level Traffic Impact Assessment Report was compiled by EDL Consulting Engineers. Refer to *Appendix C3.*

Based on the content of this Traffic Impact Assessment Report, the following key conclusions and recommendations are relevant:

- The site is part of Tshwane Region 2. The site is bordered by the planned PWV9 to the west. The site is approximately 13km west of the N1 (Polokwane) and 18km north of the N4 (Rustenburg). The site is situated to the east of Soshanguve Blocks MM and Y.
- The proposed development is for a Mixed-Use development totalling approximately 1167Ha. The development will include Residential 1 erven, Residential 4 (Social Housing) areas, Schools, Sport facilities, Business areas, Commercial areas and green belts (public open space).
- The current road network consists only of Koraalboom Road/Bultfontein Road on the eastern boundary of the site.
- Future Road network includes the planned PWV9, planned K216 & planned K216, with proposed road planning for Class 3, 4 and 5 roads shown in the Township Layout.
- Phase 1 Roads include:
    - K214 from Bultfontein Road to Phase 1 Access Road (approx. 2700m)
    - Class 3 Road from K214 to Bultfontein Road
    - Bultfontein Road to the intersection with K214 (approx. 730m)
- The following road reserve widths were used:
    - Class 2 – 62m
    - Class 3 – 32m
    - Class 4 – 25m
    - Class 5 – 13m (16m preferred)
    - Class 5 Business and Schools – 20m
- Internal Road planning was done according to the intersection spacing set out in COTO TRH26, and as follows:

- Class 2 – 800m
- Class 3 – 600m
- Class 4a – 200m to 300m
- Class 4b – 150m to 250m
- Class 5 – 75m to 250m

- Current Public Transport Facilities are not available and Future Public Transport Facilities are not planned for the area by City of Tshwane, as shown in Annexure C of TIA Report, therefore the proposed development will do the planning and construct stops and lay-byes within the site for busses and taxis to provide an efficient route for operators.
- The maximum estimated public transport demand is for the weekday PM peak hour with an estimated 6400 person trips entering the proposed development area.
- Public transport routes should be planned to service all schools, the hospital and the class 3 route as key points. Refer to Drawing 19007/PTL/01 of TIA for details.

3.4.8 Electricity

City of Tshwane Energy and Electricity Department approved the application for point of supply as part of the Township Establishment application. It is confirmed that capacity will be available once the upgrade of the Soshanguve Primary substation is completed. *Refer to Appendix D for correspondence.*

4 NEED AND DESIRABILITY

Government Notice No. 792 of 5 October 2012 provides information and guidance for applicants, authorities and interested and affected parties on requirements for the consideration of need and desirability in terms of the National Environmental Management Act, 2008 (Act No. 107 of 2008), the Environmental Impact Assessment Regulations, the Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) and the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

The table below has been compiled and completed in order to present information on the need and desirability of the proposed development in accordance with the information requirements laid down in Government Notice No. 792 of 5 October 2012.

1. Is the activity permitted in terms of the property's existing land use rights?	YES	NOv	Please explain
The land is currently zoned agriculture and application was made in terms of section 96 of the Town Planning and Townships Ordinance, Ordinance 15 of 1986 and the Spatial Planning and Land Use Management Act, 2016 (Act No. 16 of 2013) for township establishment.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YESv	NO	Please explain
In terms of the 2011 Gauteng Spatial Development Framework the activity is located directly to the south of a publicly driven development initiative zone and within an area earmarked for the urban integration of peripheral townships			
(b) Urban edge / Edge of Built environment for the area	YES	NOv	Please explain
In terms of the relevant 2018 Regional Spatial Development Framework (Region 2) the subject site is situated directly to the south of the "urban edge". Due to development pressures and incremental unlawful settlement practices that are being experienced on the subject site along the western boundary that is being shared with Soshanguve, motivation and cause exist for the future inclusion of the subject site within the "urban edge".			

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO√	Please explain
In terms of the 2018 Tshwane RSDF for Region 2 the subject site is situated directly to the south of the urban edge as well as a future urban development area. The RSDF presents the urban edge as its primary growth management tool. The urban edge is an urban management tool used to counter urban sprawl and unplanned expansion, encourage densification and protect natural resources within the city. Due to development pressures and incremental unlawful settlement practices that are being experienced on the subject site along the western boundary that is being shared with Soshanguve, motivation and cause exist for the future inclusion of the subject site within the "urban edge".			
(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
Not applicable.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO√	Please explain
The proposed site is not situated within Environmental Management Zone 1 or 5 of the Gauteng Environmental Management Framework, 2015 (GEMF, 2015).			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
Not applicable.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES√	NO	Please explain
In terms of the 2018 Tshwane RSDF for Region 2 the subject site borders the "urban edge" to the north and west and a future urban development area to the north. Development pressures that are currently being experienced from Soshanguve directly to the west of the subject site may provide the necessary motivation for the future inclusion of the subject site within the "urban edge" and subsequent prioritisation within development projects and programmes.			

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES√	NO	Please explain

Within a local context it is noteworthy that the subject site is located next to Soshanguve to the west and land earmarked for future urban development that has already been acquired by the Department of Human Settlements, Gauteng Provincial Government for that purpose to the north. Patterns of incremental unlawful occupation already occur on the property's western boundary. These development pressures from Soshanguve to the west confirms the desirability of and need for the proposed project. These developmental needs also correspond with the City Development Strategy (CDS) whereby it is the aim of the Council is to focus its investment towards the north meaning the area to the north of the Magaliesberg Mountain Range. The Council will spend in terms of the budget allocation more monies towards these areas in order to alleviate the differences in poverty and development levels.

The acting Group Head: Human Settlements Department, City of Tshwane Metropolitan Municipality also commented as follows to the proposed development (Appendix E):

"The City supports the proposed development of a Mega City project located on the farm Bultfontein 107 JR. We acknowledge the professional work done on the project such as detail urban design, environmental reports and public participation, geotechnical studies as well as detail bulk engineering reports which support the development of approximately 28 000 residential sites as well as associated mixed land uses.

The project fulfils the vision of the City to grow Soshanguve southwards and to provide development closer to major highways such as the N4 and the R80 Mabopane highway. The City further acknowledge that the land is strategically located and is one of the land parcels in Region 1 that can assist the City to unlock the housing backlog. The project is therefore supported as a Mega Human Settlement to Gauteng Department of Human Settlements".

At the same time, it transpired during the prescribed public participation process that the development proposal may not be desirable to all. The following issues and concerns that have been translated into potential impacts in the relevant sections of this report has inter alia been raised in this regard:

- Loss of agricultural land.
- Loss of property value of neighboring properties.
- Increased traffic and people, posing safety and security risk.
- Construction will have numerous negative impacts (crime, noise, dust, littering, pollution, vegetation loss, disturbance of animals).
- Negative impact on rare and protected animals, reptiles and birds. Increased pressure on the underground water resources.
- Lack of bulk service infrastructure (electricity, water, roads and sewage).

The nature and extent of such a potential impact have been considered, assessed and evaluated in the report.

5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	YES	NOV	Please explain

In terms of an engineering services availability report that was compiled for the proposed development municipal service can be provided to the proposed development (Appendix C1). However, some services upgradings are required to cater for all the phases of the proposed development. This was also confirmed by the municipality. Refer to Appendix D.

6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	YES	NO√	Please explain

An approach towards services provisioning that would divide the development in the following four phases is being proposed (Appendix C1):

- North Western Quadrant (approximately 6500 dwelling units).
- South Western Quadrant (approximately 7000 dwelling units).
- North Eastern Quadrant (approximately 7500 dwelling unit).
- South Eastern Quadrant (approximately 7000 dwelling unit).

The different phases were decided upon taking cognicance of the following number of services aspects:

- Available bulk wet services that could be accessed / utilised.
- Drainage areas and catchments.
- Existing access roads.
- Future access and road authorities.
- Costs of bulk services.

It was the rationale behind this phased approach to utilize and / or upgrade existing infrastructure effectively before embarking on the provisioning of expensive bulk infrastructure.

Greater detail regarding the proposed placement and cost of these proposals can be obtained from the relevant report (Appendix C1).

7. Is this project part of a national programme to address an issue of national concern or importance?	YES√	NO	Please explain

In terms of the National Development Plan (2030) 11 million jobs must be created in South Africa in the next 14 years (2030). The approval of this application will contribute towards this goal since the activity implies job generation both during construction and operation (contractors, gardeners, domestic workers etc.).

8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YESV	NO	Please explain
The immediate receiving environment predominantly consists of residential developments (Soshanguve and extensions) to the west and land that has been earmarked for future urban development and acquired for that purpose by the Department of Human Settlements to the north (Portion 3 of the farm Sterkwater 106 JR). Land to the east consists of Bultfontein smallholdings whilst land to the south consists of an unimproved portion of the remainder of Bultfontein 107 JR that represents the possibility of an offset area for purposes of nature conservation. The possibility of a development offset area however does not form part and parcel of the development proposal and its realisation will inter alia be subject to the following: • The availability of extensive specialist studies proving that such a biodiversity offset site will have the same ecological value and functioning as the site proposed for development; and • The successful development of management plans to depict how the applicant plans to manage and rehabilitate the offset site.			
9. Is the development the best practicable environmental option for this land/site?	YESV	NO	Please explain
The proposed development represents a mixed land use development directly adjacent to the urban edge and an area that has been earmarked for future urban development. Due to development pressures from Soshanguve and extensions directly to the west that result in incremental unlawful land occupation and sand mining practices on the subject site, the proposed development is being considered as the best practicable environmental option for the subject site.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YESV	NO	Please explain
The impact assessment provided for elsewhere in this report suggests that no adverse negative impacts are envisaged in mitigated form and that the benefits of the proposed land use / development outweigh the negative impacts of it.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NOV	Please explain
The proposed development does not represent the first mixed land use development in the area. A precedent in this regard has already previously been set previously with the establishment of the adjoining Soshanguve and extensions.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NOV	Please explain
It may be the position of the owners of adjacent smallholdings to the east of the subject site that the proposed development may impact negatively on their property rights. The nature and extent of such a potential impact have been considered, assessed, and evaluated in the report.			

13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YESV	NO	Please explain
In terms of the Tshwane 2018 RSDF for Zone 2 the "urban edge" is at present situated directly to the north and west of the subject site.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YESV	NO	Please explain
Sector 8: Greenfield transformation to urban or industrial form; and Sector 10: Township development			
15. What will the benefits be to society in general and to the local communities?			Please explain
• According to the National Development Plan, 11 million jobs must be created in South Africa in the next 15 years (2030). The approval of this application can contribute towards the achievement of this goal. • If approved, the owners' investment in the activity will also stimulate economic activity for other local businesses. The value of such an investment in terms of local economic development, should not be underestimated. • The municipality will also benefit from the proposed change of land use, because the value of the property will increase which will potentially result in higher rates and taxes. • Job creation both during construction and operation represents another potential benefit to society in general and to the local communities.			
16. Any other need and desirability considerations related to the proposed activity?			Please explain
In terms of the City Development Strategy (CDS) the aim of the Council is to focus its investment towards the north, meaning the area to the north of the Magaliesberg Mountain Range. The Council will spend in terms of the budget allocation more monies towards these areas to alleviate the differences in poverty and development levels.			
17. How does the project fit into the National Development Plan for 2030?			Please explain
In terms of the National Development Plan (2030) 11 million jobs must be created in South Africa in the next 14 years (2030). The approval of this application can contribute towards this goal since the activity implies job generation both during construction and operation (contractors, tenants, residents, gardeners, domestic workers etc.).			
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.			
This report represents the embodiment of the general objectives and requirements of Integrated Environmental Management as set out in section 23 of NEMA.			
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.			

People and their needs have been placed at the forefront of this assessment by taking into account the impact of the proposed activity on their physical, psychological, developmental, cultural and social interests. The assessment took into account the proposed development's social, environmental and economic sustainability by inter alia avoiding or minimising and remedying the following if and where applicable:

- The disturbance of ecosystems, loss of biological diversity and pollution and degradation of the environment;
- Pollution and degradation of the environment (e.g. the installation of water borne municipal sanitation infrastructure that will not interfere with the groundwater regime);
- The disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied (e.g. no structures of cultural importance are present on the property);
- Waste (waste will be disposed of at a permitted landfill site); and
- The use and exploitation of non-renewable natural resources (e.g. energy saving technology alternatives).

Negative impacts on the environment and on people's environmental rights by assessing potentially negative impacts in the selection of preferred alternatives and providing appropriate mitigating measures (no potentially adverse negative impacts have been identified during the impact assessment process).

The assessment also followed a risk-averse and cautious approach, which takes into account the limits of current knowledge about the consequences of decisions and actions as is reflected in the opinion of the EAP in this report.

It has been acknowledged in the assessment that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option / alternative.

Environmental justice has been pursued in that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons. This has been achieved by ensuring that the proposed activity will not lead to adverse environmental impacts.

Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being has been pursued and measures have been taken to ensure access to it.

The social, economic and environmental impacts of activities, including disadvantages and benefits, have been considered, assessed and evaluated in the report, and decisions are deemed appropriate in the light of such consideration and assessment.

The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers is being respected and protected in inter alia the relevant EMPr.

The regulatory requirement to advertise any resultant Environmental Authorisation and the placement of information within the public domain during any regulatory process guarantee transparency and access to information.

Intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment will be promoted by keeping governmental stakeholders informed on any regulatory process and providing them with draft reports.

It is being understood that actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.

The study was also conducted with the underlying understanding that the environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.

The relevant EMPr ensures that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

5 LEGAL FRAMEWORK

5.1 The Constitution of South Africa (No. 108 of 1996)

Section 24 of the Constitution of South Africa (No. 108 of 1996) states that "…everyone has the right – (a) to an environment that is not harmful to their health or well-being; and … (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (c) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development. These principles are embraced in the National Environmental Management Act (Act No. 107 of 1998) (as amended) and given further expression.

5.2 The National Environmental Management Act (No. 107 of 1998)

National Environmental Management Act, Act 107 of 1998: The Environmental Impact Assessment Regulations 2017: The NEMA EIA 2017 regulations and the listing notices thereto are relevant.

In terms of the EIA Regulations (GN R. 327, 325 and 324) of April 2017, a number of listed activities, as summarised in the table below, have been identified that may be triggered by the proposed project, and which will subsequently require environmental authorisation from GDARD:

Table 3: Listed activities in terms of NEMA for the proposed New Eersterus X 15 Township:

Relative Notice	Description (Verbatim and applicability to the project)
GN.R. 327, 7 April 2017 Listing Notice 1 Activity 12 The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse;	The proposed development will include the installation of infrastructure, including roads, water, sewer and stormwater pipelines, within the non-perennial rivers on the site.
GN.R. 327, 7 April 2017 Listing Notice 1 Activity 19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	The proposed development will include the installation of infrastructure, including roads, water, sewer and stormwater pipelines, within the non-perennial rivers on the site.
GN.R. 327, 7 April 2017 Listing Notice 1 Activity 24 The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	To allow for the internal and access roads.
GN.R. 327, 7 April 2017 Listing Notice 1 Activity 28 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: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed development will cover an area of approximately 1190 hectares on land previously used for agricultural activities located outside an urban area.

excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	
GN.R. 327, 7 April 2017 Listing Notice 1 Activity 67 Phased activities for all activities— (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.	To make provision for construction of the development to be phased.
GN R. 325, 7 April 2017 Listing Notice 2 Activity 15 The clearance of an area of 20 hectares or more of indigenous vegetation	The proposed development will cover an area of approximately 1190 hectares and will require the clearance of indigenous vegetation.
GN R. 324, 7 April 2017 Listing Notice 3 Activity 4 The development of a road wider than 4 metres with a reserve less than 13,5 metres. c)Gauteng i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus Areas; iii. Gauteng Protected Area Expansion Priority Areas; iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority; vii. Sites identified as high potential agricultural land in terms of Gauteng Agricultural Potential Atlas; viii. Important Bird and Biodiversity Area (IBA);	To allow for the construction of internal and access roads within CBAs and ESAs.

ix. Sites or areas identified in terms of an international convention; x. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA; xi. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks; or Sites zoned for conservation use or public open space or equivalent zoning.	
GN R. 324, 7 April 2017 Listing Notice 3 Activity 12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. a. Gauteng i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	The proposed development will cover an area of approximately 1190 hectares and will require the clearance of indigenous vegetation within CBAs and ESAs.

5.3 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).
- Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

- National Spatial Biodiversity Assessment, The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

An ecological specialist was appointed to undertake the flora and fauna biodiversity assessment, with specific attention to Red Data Listed species, habitats and biodiversity. The specialist study is aligned to requirements of this act. The proposed development aligns to the purpose of this Act and the above-mentioned specialist report.

According to the Ecological Habitat Survey the subject site falls within a Critical Biodiversity Area or Ecological Support Area.

Although it is contended that the NEM:BA does not have a direct bearing on the subject site and its envisaged development, it is important that the presence of Critical Biodiversity Areas (important) and an Ecological Support Area is considered within the broad parameters of this Act.

5.4 National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

This Act (NEM:PAA) aims to provide for a national system of protected areas in South Africa as a part of a strategy to manage and conserve its biodiversity. The Protected Areas Act tries to ensure protection of the entire range of biodiversity, referring to natural landscapes and seascapes.

The Act makes express reference to the need to move towards Community Based Natural Resource Management (CBNRM) as its objectives include promoting the participation of local communities in the management of protected areas.

The purpose of the Act is:

- To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes and their ecological integrity;
- To conserve biodiversity in those areas;
- To protect South Africa's rare species;
- To protect vulnerable or ecologically sensitive areas;
- To assist in ensuring the sustained supply of environmental goods and services;
- To provide for the sustainable use of natural and biological resources;
- To create or augment destinations for nature-based tourism;
- To manage the interrelationship between natural environmental biodiversity, human settlement and economic development;
- To contribute to human, social, cultural, spiritual and economic development; and
- To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

This Act further stipulates various criteria which must be met before an area can be declared as a special nature reserve, national park, nature reserve and protected environment. It also prescribes a range of procedures, including consultation and public participation procedures, which must be followed before any of the kinds of protected areas are declared.

Although according to the relevant SANBI BGIS biodiversity report the subject site is not situated within a protected area, in terms of the National Department of Environmental Affairs' South African Protected Areas Database Q2 2019 it forms part of the Sterkwater Nature Reserve (declared in 1954) together with Portions 2, 3 & 4 of the farm Sterkwater 106 Sterkwater as well as the farm Zandkop Zyn Laagte 108 JR.

Also, during 1954 the adjacent smaller portions of the farm Bultfontein 107 JR has been proclaimed as

the Gelderland Reserve.

The status of the subject sites has been confirmed by Ms. Christina Seegers, Control Biodiversity Officer: Biodiversity Stewardship, Gauteng Department of Agriculture & Rural Development (Appendix 23).

It would appear as if the legal status of both the Sterkwater Nature Reserve and the Gelderland Nature Reserve was never enforced or implemented in practice. It is stated by Ms. Seegers that from Google Earth it appears that the area comprising the Gelderland Private Nature Reserve has been transformed into smaller land portions. The reasons for this are that nature reserve (NR) declarations under older legislation did not require title deed endorsements. As a result, there are scenarios in the province where NRs have been transformed but the legal status still stands. A NR remains legally declared if there is a gazette notice even if the area has been transformed.

Since 2004, provinces have primarily used the National Environmental Management: Protected Areas Act, 57 of 2003 (NEM: PAA) to declare PAs because it addresses the shortcomings of older legislation. The NEM: PAA has a 'deeming' clause, S12, which recognizes all PAs declared pre-NEM: PAA and such an area thus has legal standing, as per the NEM: PAA.

The GDARD Biodiversity Stewardship Unit is in the process of conducting an analysis of all protected areas in the province to understand their conservation viability etc. This is however time consuming, given capacity constraints, and will take considerable time to complete. Ideally, PNRs that have been transformed, should be de-proclaimed.

According to section 5(6) of the National Environmental Management: Protected Areas Act (No. 57 of 2003 (NEM: PAA), where there is significant degradation or changes to the attributes of the site that are irremediable the Minister or MEC may withdraw the status of the private nature reserve in terms of section 24(1) or (2) of the Act.

Based on the aforegoing it is clear that the original intention of both the Sterkwater and Gelderland Private Nature Reserves has never been pursued and that its status should not as such prevent development from taking place. Prior to proclamation the status of the Nature Reserve will however have to be withdrawn in terms of section 24(1) or (2) of the Act.

5.5 National Environmental Management Waste Act (NEMWA), 2008 (Act No. 59 of 2008) (as amended)

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 have been considered for purposes of potential relevance.

Following a detailed analysis of the proposed project, it was concluded that the proposed project components will not trigger any activity that will require an application for a WML.

The compilation and implementation of a waste management plan however needs to be made a condition of any environmental authorisation.

5.6 National Water Act, 1998, Act 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 througha 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.

It is the contention of the writer that the proposed development will require a water use licence for one or more water crossings in terms of the following sections of the National Water Act (Act No. 36 of 1998):

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

5.7 National Environmental Management: Air Quality Act, Act 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 License (AEL) be obtained for such listedactivities. Such a list of activities was published in GNR 248 (31 March 2010).

Following a detailed analysis of the proposed project against the activities listed in GNR 248, the opinion is being expressed that based on information at hand, none of these activities will be triggered.

The City of Tshwane Municipality is responsible for the issuing of AEL's in this instance. The said Municipality has also been notified about the proposed activity and as a registered Interested and Affected Party will be provided with a draft copy of this report and an opportunity to comment.

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

The Act sets requirements for assessment of impacts on the cultural and heritage assets, the processes to be followed in notifying the competent authority and the elements of a report on the assessment. The protection of archaeological and palaeontological resources is the responsibility of a provincial heritage resources authority and all archaeological objects, palaeontological material and meteorites are the property of the State. "Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority".

A Heritage Impact Assessment must be done under the following circumstances:

a. Any development or other activity that will change the character of a site and exceed 5 000m^2 or involve three or more existing erven or subdivisions thereof
b. Re-zoning of a site exceeding 10 000 m^2

The size of this site qualifies for a Heritage Impact Assessment (HIA). A Cultural Heritage Consultant was appointed to conduct a HIA.

A Heritage Impact Assessment was conducted (refer to Section 6.3.4 and Appendix C6).

5.9 The National Forest Act (No. 84 of 1998)

The purpose of this Act is to:

(a) Promote the sustainable management and development of forests for the benefit of all.
(b) Create the conditions necessary to restructure forestry in State forests.
(c) Provide special measures for the protection of certain forests and trees.
(d) Promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.
(e) Promote community forestry.
(f) Promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

The Act places obligations on two parties, broadly speaking, i.e.

(a) Owners of land with forest resources, or their forest managers or other agents, and
(b) Citizens at large, who may use or otherwise benefit from forest resources.

While the provisions of the Act are in many cases confined to State forests, such provision may be extended to private land where appropriate. This is through sections 8(c) regarding protected areas, section 12 on protected trees, section 17(4), which allows the Minister to declare a controlled forest where needed to prevent or reverse forest destruction, and through section 21, to promote the voluntary grant of access to forests other than State forests (in which case those enjoying access are subject to the rules of access). These provisions allow the promotion of the objects of the Act under wide circumstances.

The Department of Agriculture, Forestry and Fisheries (DAFF) is responsible for the enactment of this Act.

One protected tree species namely the *Sclerocarya birrea* (Marula Tree) is sparsely distributed at the site (Appendix C5). In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

Environmental authorisation forms part of the relevant licence application requirements and needs to be obtained and submitted prior to the issuing of a licence.

Compliance with this Act is a requirement and will receive consideration upon receipt of Environmental Authorisation.

5.10 The Restitution of Land Rights Act Amendment Act (No. 15 of 2014)

It has been confirmed by the Office of the Regional Land Claims Commissioner: Gauteng that claims against the subject site were lodged by the following claimants (Appendix H):

Claim reference	Claimant	Date of claim
R/3/115/259/43661	Mahlangu, Zabeneni Philemon	10 September 2014
R/3/115/259/43644	Mahlangu, Zabeneni Philemon	12 January 2015
R/3/115/259/43591	Mahlangu, Vimbi Petrus	9 Janury 2015

The following information has also been provided in this regard:

The claim was lodged in terms of the Restitution of Land Rights Amendment Act, 2014 (Act No 15 of 2014) ("the Amendment Act") which, amongst others, reopened the lodgement of claims for a period of five years.

The validity of the Amendment Act was challenged in the Constitutional Court. The Constitutional Court found the Amendment Act to be invalid because of the failure of Parliament to facilitate public involvement as required by the Constitution. The Amendment Act ceased to be law on 28 July 2016.

The Constitutional Court ordered that the claims that were lodged between 1 July 2014 and 27 July 2016 are validly lodged, but it interdicted the Commission from processing those claims until the Commission has finalised the claims lodged by 31 December 1998 or until Parliament passes a new law providing for the re-opening of lodgement of land claims. Parliament was given until 27 July 2018 to pass such a law.

Parliament has so far not been able to pass new legislation and has instead approached the Constitutional Court for an extension until 29 March 2019 and the application was rejected. As a result the Commission will, unless directed otherwise by Constitutional Court, not be processing claims lodged between 1 July 2014 until 27 July 2016 until all the claims lodged on or before 31st December 1998 are finalised and or a new Act is passed by Parliament and signed into law by the President. In the meantime, the Commission through the Chief Land Claims Commissioner has been ordered to report the progress of all the outstanding land claims on six months basis for monitoring by the court.

The Commission will contact you directly and communicate widely once we have been granted permission to begin dealing with these claims.

Although the registration of land claims on the subject site needs to be recorded, it does not as such prevent or restrict land transfers and development.

5.11 Occupational Health and Safety Act, 1993, Act 85 of 1993

The objective of this Act is to provide for the health and safety of persons at work. The considerations of the Act must be incorporated into the Environmental Management Programme during the EIA process.

5.12 Provincial Legislation

The Gauteng Conservation Plan (C-Plan)

According to the Gauteng Conservation Plan (C-Plan), the areas on the centre and south-eastern part of the proposed development site are classified as an CBA (Important Area). The high sensitivity status is

attributed to the potential presence of an orange-listed plant habitat and primary vegetation. In addition, the watercourse and the rocky outcrop area are classified as Ecological Support Areas. Therefore, the proposed development conflicts with the objectives of the C-plan.

The Gauteng Agricultural Potential Atlas (GAPA)

According to the Gauteng Agricutural Potential Atlas (GAPA) the proposed development site consists of soils with low agricultural potential. Therefore, the agricultural loss associated with the proposed development is negligible. An Agricultural Potential Survey was not deemed necessary.

The Gauteng Provincial Environmental Management Framework (GPEMF)

The proposed development site is located within Zone 4: Normal Control Zone as informed by the Gauteng Provincial Environmental Management Framework (GPEMF). The framework indicates that the zone is dominated by agricultural uses outside urban development zones and that the proposed mixed-use development is not desirable in this zone. However, the site is bordered by the existing Soshanguve Township on the west and farm householdings on the east. In addition, the site has not been used for any agricultural purposes in the recent past as informed by Google Earth and Tshwane GIS.

5.13 Municipal Policy and Frameworks

The Tshwane Open Space Framework

According to the Tshwane Open Space Framework (TOSF), the proposed development site consists of a Green way namely the Bultfontein and Honeyvale Hills. However, the proposed development is planned outside the aforementioned rocky ridge and thus does not conflict with the TOSF's objectives (refer to Figure 3, Layout Plan)

The draft Bioregional Plan for the City of Tshwane

The draft bioregional plan for the City of Tshwane indicates that the majority of the proposed development site is situated within Other Natural Areas that is not deemed ecologically sensitive. Therefore, the proposed development therein is aligned with the objectives of the Bioregional Plan.

The areas associated with watercourses and rocky outcrops are regarded as Ecologically Sensitive. In addition, areas in the centre and south eastern parts of the proposed development site is being regarded as Critical Biodiversity Areas. It is noted that the proposed development is planned over the above mentioned sensitivities and to this extent the proposed development conflicts with the Bioregional Plan's objectives.

The Ecological Habitat Survey included ground truthing and impact significant verification *(refer to Appendix C5 and Section 6.2.1).* The layout plan was amended to exclude the rocky outcrops and sensitive vegetation. *Refer to Figure 3, Layout Plan.*

6 DESCRIPTION OF RECEIVING ENVIRONMENT

This chapter provides a description of the receiving environment within the study area. Three components to the environment are recognised:

- Physical Environment;
- Biological Environment; and
- Socio-Economic Environment.

6.1 Physical Environment

6.1.1 Climate

The area is characterised by summer rainfall with very dry winters. Effectively three seasons, namely a cool dry season from May to mid-August, a hot dry season from mid-August to about October and a hot wet season from about November to April. Annual precipitation ranges from about 500mm to about 700 mm. Frost is fairly infrequent. The mean monthly maximum and minimum temperatures ranges from 35.3˚ C to -3.1˚C for November and June (Mucina & Rutherford: 2006).

6.1.2 Topography and drainage

The proposed development slightly sloping from south west (approximately 1220 m above mean sea level) to north east (1180 m above mean sea level) (Google Earth 2019).

The area under investigation falls within the A23E quaternary catchment of the Crocodile/Marico (West) Water Management Area (WMA3). Regional drainage is roughly towards the north via the Tshwane River.

6.1.3 Geology and Geohydrology

The following information has been extracted from the Engineering Geological Investigation Report undertaken by Rocksoil Consult. Refer to Appendix C4.

6.1.3.1 Regional Geology

According to the 1:250 000-scale 2528 Pretoria Geological Sheet the region is mainly underlain by “Mr” to the south and “Mn” towards the north and at depth with “Pe” to the north and east of the site.

The symbols represent the following formations:
• Mr: Granophyre, pseuogranophyre, microgranophyre; granite porphyry of the Rashoop Granophyre Suite from the Bushveld Igneous Complex.
• Mn: Grey to pink coarse-grained granite; medium-grained near top - Nebo Granites of the Lebowa Granite Suite from the Bushveld Igneous Complex.
• Pe: Shae, shaly sandstone, grit, sandstone, conglomerate, coal in places near bae and top of the Ecca Group, Karoo Supergroup.

The site is not underlain by potentially soluble rock formations such as dolomite and limestone. The site is considered non-dolomitic and a dolomite stability investigation is not required.

Numerous structural features such as faults and linear features are indicated on the geological sheet. The features include fault, geological contact and possible diabase and/or syenite intrusions/dykes. A cropped section of the regional geology is depicted in Figure A7, Appendix B of Engineering Geological Investigation Report *(refer to Appendix C4).* A prominent NS striking linear structure exists in the western portion of the site. The linear structure may be diabase or syenite as encountered in the region.

A prominent NS striking syenite dyke is situated approximately 4.5 km to the east of the site with an NNE to SSW striking diabase dyke approximately 3.6km to the west.

No economically feasible mineral deposits are present on or in the near vicinity of the site that will negatively impact the developability of the site.

6.1.3.2 Site Specific Geology

The site-specific conditions were evaluated by means of excavation of 99 test pits. The positions of the test pits are depicted in Figure A9, Appendix A of Geological Investigation Report. The detailed individual

soil profile logs are attached as Appendix A. A summary sheet with the layer types and thicknesses are provided in Appendix E, Engineering Geological Investigation Report *(refer to Appendix C4)*.

The site is mainly covered with transported soils (colluvium and alluvium) that is underlain by reworked residual granophyre (mainly towards the south-western site portion) and granite (remainder of the site). The residuum transgresses into completely weathered to highly and moderately weathered medium strong to strong rock in places.

Some degree of pedogenic formation was encountered in all of the trial pits excavated.

Localised areas or rock outcrop were identified across the site. Prominent rock outcrop and shallow rock were encountered towards the southern and south-western portions of the site.

6.1.3.3 Geohydrology

The depth to permanent water table is unknown and determination thereof falls outside the scope of this assessment. The regional and site-specific slope and drainage direction direction is towards the north. Drainage features were identified on site (see Figure A5, Appendix A), Engineering Geological Investigation Report *(refer to Appendix C4)*. Rainwater is expected to mainly drain as surface water and subsurface flow, through the upper transported and residual soil horizons (and on but not limited to the soil/rock interface), mainly perpendicular to the ground contours, in the direction of the drainage features, from where it will flow mainly as concentrated flow.

Based on the pedogenic formation encountered in the trial pits and vegetational anomalies form the available GoogleEarth images, shallow seasonal seepage water conditions can be expected throughout the majority of the site, especially towards the lower-lying regions around the drainage features. Stormwater management and drainage precautionary measures will be essential. The depth of expected seasonal seepage water can be correlated with the depths of pedogenic formation encountered in the trial pits. The depth of pedogenic formation is provided in Table E5, Appendix E, Engineering Geological Investigation Report *(refer to Appendix C4)*.

Broad regions of expected seasonal seepage water conditions less than 1.5 mbgl are depicted in Figure A8, Appendix A, Engineering Geological Investigation Report *(refer to Appendix C4)*. Drainage precautionary measures will be required.

6.1.3.3 Major Geotechnical Constraints

The following geotechnical constraints were encountered on the site:

Collapsible soils

The upper transported and residual soils generally have an open soil structure (voided) with a medium to high collapse potential. Earthworks and foundation precautionary measures will be required.

Areas of expected seasonal seepage water

Shallow seasonal seepage areas were identified throughout the majority of the site. Drainage precautionary measures will be required.

Localised areas with expected soil heave

The on-site soils are in general not active. Based on the PI and clay fraction (van der Merwe's Method) (van der Merwe D., 1964) the on-site materials generally exhibit a low potential expansiveness, as depicted in Chart R3 of Geotechnical Investigation Report *(refer to Appendix C4).*

Highly compressible upper soils
The in-situ soils in general are compressible. The soils will however be mainly incompressible in the compacted state. Earthwork and/or foundation precautionary measures will be required for structures.

Erodability of the soil once exposed and subject to concentrated water flow
Considering the site slope and nature of the soils, the on-site soils are expected to have a moderate susceptibility towards water erosion, especially if subject to concentrated water flow. Basic surface water flow control measures will be required to prevent excessive erosion and undercutting of structures.

Excavation difficulty
The excavatability of the materials are provided in the individual soil profile descriptions. The excavation depths and excavatability are summarized in Table E5, Appendix E, Geological Investigation Report *(refer to Appendix C4).* Shallow excavation difficulty was generally encountered towards the southern to south-western portions of the site.

Excavation difficulty and the use of pneumatic equipment and/or localised blasting may be required in areas across the site, especially towards the southern to south-western site portions.

Encountered outcrop and test pits with excavation difficulty experienced in confined trench conditions with a TLB are depicted in Figure A10, Appendix A, Geotechnical Investigation Report *(refer to Appendix C4).*

Localised areas with steep slopes
The slopes are generally fair to moderate. Areas of steep slopes are present on-site, however, mainly very localised and limited to the drainage features that will probably fall outside the developable site portions.

Areas subject to flooding.
A flood assessment falls outside the scope of this assessment. A number of drainage features were identified on-site. Localised flooding can be expected. The areas subject to flooding should be determined by a competent person. Residential development should ideally be excluded from regions falling below the 1:100-year flood line, or as otherwise indicated by a competent person or relevant national standards.

6.1.3.4 Preliminary Geotechnical Zonation

The site is preliminary assigned with 5 (Five) broad geotechnical zones namely:

- Zone I: C1-R//1AD 2B 2-3EF (2I)
- Zone II: C1-R-P(Borrow Activities)//1-2AD 2B 2-3EF (2I)
- Zone III: C2-C1-R//2ABD 2-3EF (2-3L)
- Zone IV: C2-C1-P(Developed) // 2ABDE (2-3F)
- Zone V: C2-C1-R//2ABD 2-3E (2-3FL)

Zones I to Zone IV are depicted in Figure A11, Appendix A, Geological Investigation Report *(refer to Appendix C4). Refer to Figure 7 below.*

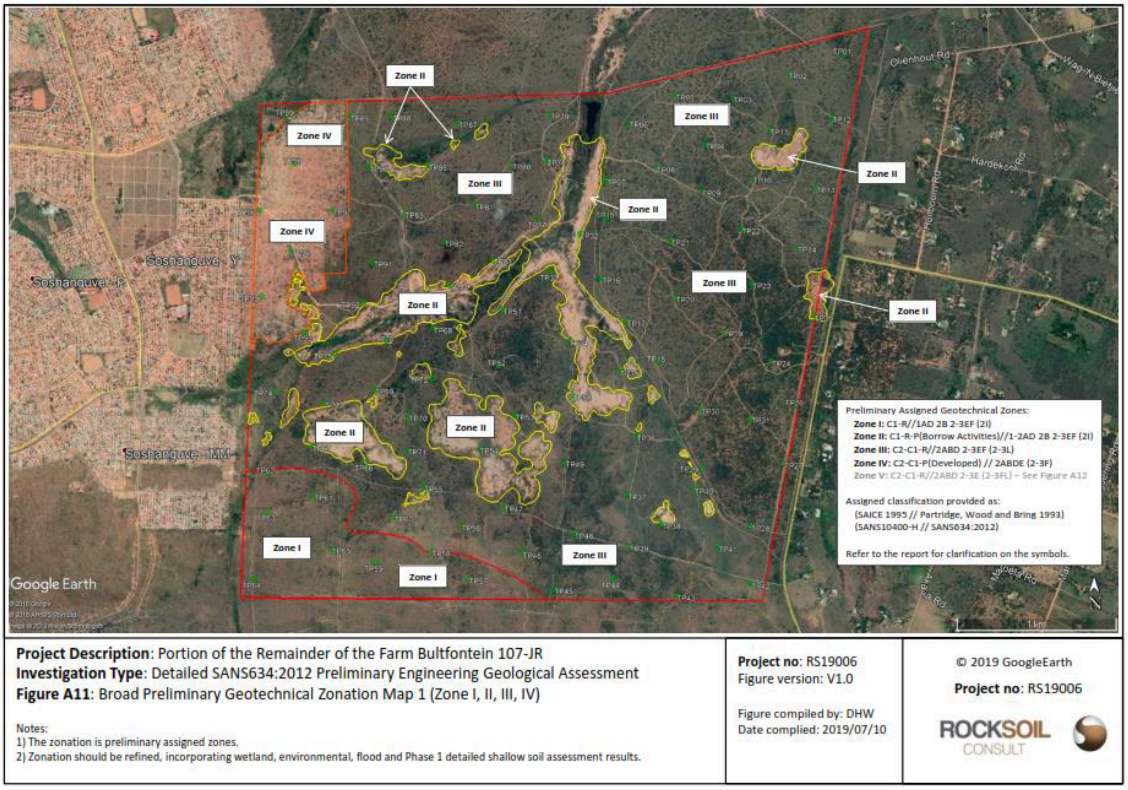


Figure 7: Geotechnical Zonation Map 1 (Zones I, II, III, IV)

Zone IV is illustrated in Figure A12, Appendix A, Geological Investigation Report. Refer to Figure 8 below.

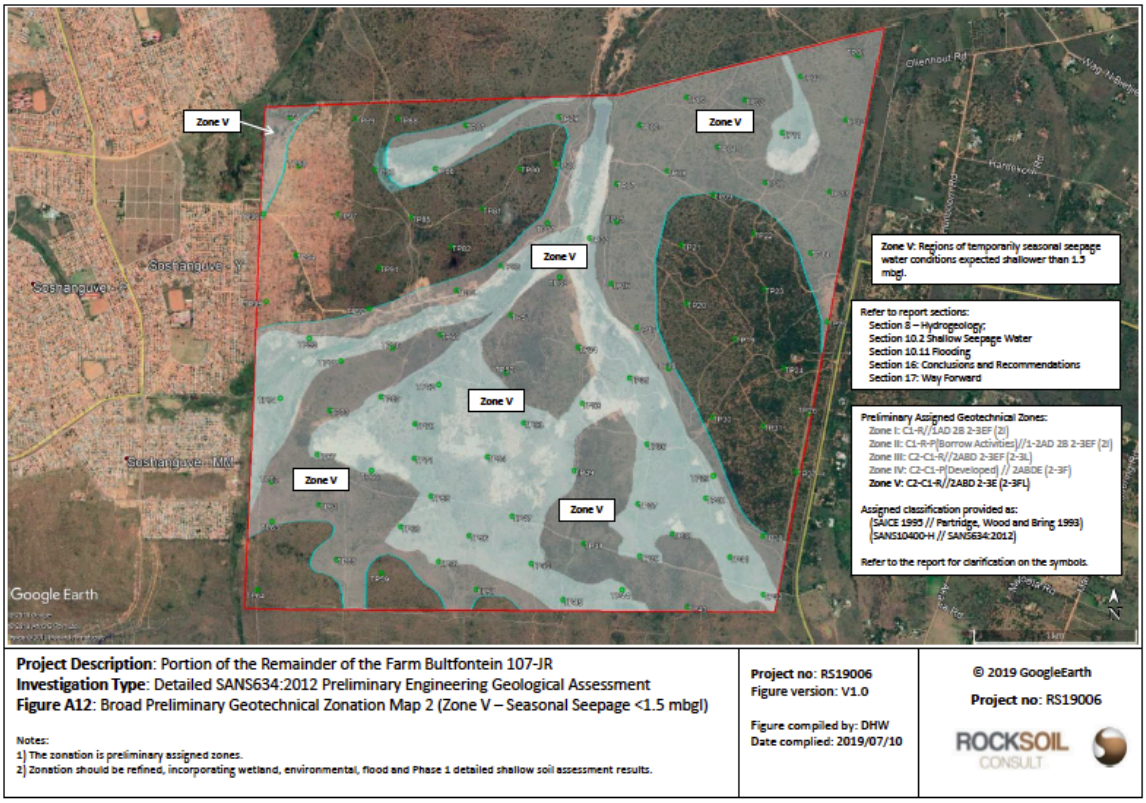


Figure 8: Geotechnical Zonation Map 2 (Zone V – Seasonal Seepage)

The areas subject to flooding should be determined and certified by a competent person. These potential flood areas should be incorporated into the town planning and Phase 1 detailed engineering geological assessment.

The environmental sensitive and potential wetland regions should be determined by competent persons. These zone boundaries should be incorporated into the town planning and Phase 1 detailed engineering geological assessment.

6.1.3.5 Installation of Services

Installation of services is affected by a number of factors, including but not limited to:

1. Excavatability of the soil/rock;
2. Presence of shallow water;
3. Site slope;
4. Reusability of the excavated materials;
5. Compactability of the materials at or below depth of the proposed service.

Excavation difficulty can be expected across large regions, especially towards the south-western portion of the site. Use of pneumatic equipment and blasting will be required in areas. Seasonal seepage water conditions are of concern across the majority of the site and proper drainage precautionary measures and construction phasing and timing will be required. The site slope is generally favourable for installation of services. Very localised areas of steep slopes are present that will require basic design or construction modifications/specifications. The soils at expected services depth are generally expected to have fair to good compaction characteristics if properly drained.

6.1.3.6 Foundation Options and Recommendations

Residential foundation options and recommendations should be guided by the South African National Standards, Part H on Foundations (SANS10400-H, 2012), considering the assigned residential designation and estimated total and differential movements provided. Geotechnical and/or structural solutions can be considered. The selection of either a geotechnical or structural solution depends upon the practicality and economy of the solutions in question (SANS10400-H, 2012).

Geotechnical Solutions

Geotechnical solutions generally eliminate or reduce the total soil movements to within limits which can be tolerated by buildings without distress by means of one of the following (SANS10400-H, 2012):
a) Removal of the soil horizons that cause unacceptable differential movements and replacement of these horizons with inert material suitably compacted or the reuse of the excavated material as founding material in a compacted form;
b) Founding of the wall footings at a deeper level than is commonly associated with normal construction, i.e. a suitable founding horizon below the horizons within which relatively large movements might take place (where soil conditions allow); and
c) Densification of the soil horizons that cause unacceptable differential movement by means of surface compaction.

Structural Solutions

Structural solutions employ techniques to improve flexibility or stiffness and strength, which reduce the effects of differential soil movements to a level that can be tolerated by a building without significant damage (SANS10400-H, 2012).

Foundation Solutions

The upper transported and reworked residual horizons are generally open structured (voided) with a medium to high collapse potential. Oedometers and collapse potential tests should be conducted in the Phase 1 detailed SANS634:2012 engineering geological assessment in order to quantify the amount of collapse/consolidation expected in these soils. Based on the preliminary broad zones assigned to this site, foundation modifications for single to double-storey residential structures can be aligned to shallow soil designation classes "C2" and "C1". Areas of shallow competent founding horizons are present, mainly Zone II, where foundation design for class "C-R" may be considered.

Foundation design, building procedures and precautionary measures for single-storey type 1 masonry buildings founded on soil horizons subject to both consolidation and collapse settlement can be summarized as:

Collapsible and Compressible Soils

Site Class "C":

Normal:

• Normal construction (strip footing or slab-on-the-ground) foundations.
• Foundation bearing pressure not to exceed 50 kPa.
• Good site drainage.

Site Class "C1":

Modified normal:

• Reinforced strip footings.
• Articulation joints at some internal and all external doors.
• Light reinforcement in masonry.
• Site drainage and service and plumbing precautions.
• Foundation pressure not to exceed 50 kPa.

Compaction of in-situ soils below individual footings:

• Remove in-situ material below foundations to a depth and width of 1.5 times the foundation width or to a suitable soil horizon and replace with inert material compacted to 93 % MOD AASHTO density at -1% to +2% of optimum moisture content.
• Normal construction with lightly reinforced strip foundations and light reinforcement in masonry.

Deep strip foundations:

• Normal construction with drainage precautions.
• Founding on a suitable founding horizon below the horizons within which relatively large movements might take place.

Soil raft:

• Remove in-situ material to 1.0 m beyond the perimeter of the building to a depth of 1.5 times the widest foundation or to a suitable soil horizon and replace with material compacted to 93 % MOD AASHTO density at -1% to +2% of optimum moisture content.
• Normal construction with lightly reinforced strip footings and light reinforcement in masonry.

Site Class "C2":

Stiffened strip footings, stiffened or cellular raft:

• Stiffened strip footings or stiffened or cellular raft with lightly reinforced or articulated masonry.
• Bearing pressure not to exceed 50 kPa.
• Fabric reinforcement in floor slabs.
• Site drainage and service plumbing precautions.

Deep strip foundations:
• Normal construction with drainage precautions.
• Founding on a suitable founding horizon below the horizons within which relatively large movements might take place.

Compaction of in-situ soils below individual footings:
• Normal construction with fabric reinforcement in floor slabs.
• Drainage precautions.
• Founding on a suitable founding horizon below the horizons within which relatively large movements might take place.

Soil raft:
• Remove in-situ material to 1.0 m beyond the perimeter of the building to a depth of 1.5 times the widest foundation or to a suitable soil horizon and replace with material compacted to at least 93 % MOD AASHTO density at -1% to +2% of optimum moisture content.
• Normal construction with lightly reinforced strip footings and light reinforcement in masonry.

Piled or pier foundations:
• Reinforced concrete ground beams or solid slabs on piled pier foundations.
• Ground slabs with fabric reinforcement.
• Good site drainage.

Larger Structures

Larger structures should be design by a competent engineer. Input can be provided upon request if load schedules and allowable structural tolerances are available.
Foundation design should consider the expected differential movement resulting from expected collapse settlement (Soil designation classes “C2” and “C1”).

Foundation options will probably include one or a combination of the following:

Stiffened strip footings, stiffened or cellular raft.
Deep strip foundations compacted of in-situ soils below individual footings.
Soil raft.
Piled or pier foundations.

A combination of soil raft and stiffened strip footings, stiffened or cellular raft construction will probably be recommended, depending on the structural details, load schedules and sensitivity of the structures. The design engineer should ideally liaise with the engineering geologist to optimize foundation designs.

Foundations for Free-Standing Walls and Retaining Walls

Foundations for free-standing walls and retaining walls that comply with the requirements of SANS 10400-K shall be in accordance with the specifications provided in SANS10400-H. Earthwork and design input can be provided upon request, once conceptual designs are available. Rip and compaction of the in-situ soils below the foundations will be recommended in order to break down the collapsible soil structure to limit differential movement and resulting unwanted structural damage. Rip and proper re-compaction practice will probably be the most feasible/effective approach.

High Bearing and/or Sensitive Structures

Bearing capacity input should be provided for all high-bearing or sensitive structures. The design engineer should liaise with the engineering geologist for input on all high bearing structures/foundations such as high bearing pad footings, shallow high bearing strip foundations, elevated reservoirs, ground based sensitive concrete dams etc.

Existing Structures, Infrastructure or Workings

Areas of existing structures (Zone IV) and areas of mine workings (Zone II) are present on site. Basic rehabilitation and foundation precautionary measures will be required for structures to be erected in these areas. The same will apply in areas affected negatively by existing or historic underground infrastructure or workings of any kind. Foundation options and solutions should be provided for these regions in the Phase 1 detailed engineering geological assessment. Earthwork and foundation options may include basic rehabilitation, soil mattress and/or foundation and masonry reinforcement.

6.1.3.7 On-site Material as Construction Material

Input on construction materials is based on grading analysis, Atterberg, typical performances based on soil classification systems and local knowledge of the materials. Typical material properties and expected performance for different construction purposes are provided in the tables attached in Appendix F, Geological Investigation Report.

The potential and expected performance for selective construction purposes are briefly discussed in the following report sections. The materials should be assessed in more detail in the Phase 1 detailed engineering geological assessment.

6.1.3.8 Conclusions and Recommendations

The following can be concluded:

• The majority of the site is deemed suitable for the proposed development, as from a geotechnical perspective.

• A number of general geotechnical constraints were identified that will require design precautionary measures.

• Flood risk and environmental constraints can be expected in areas and should be refined by the relevant specialist assessments.

The following assessments will be required to refine broadly assigned zones:

• Floodline assessment with certified 1:50-year and 1:100-year floodlines.

• Wetland delineation with indicated wetland boundaries and environmental sensitive areas to be excluded from the proposed development.

• Site-specific ground survey for identification of potential flash-flood areas/paths to incorporate and address in the stormwater drainage designs.

6.1.3.9 Way Forward

This detailed preliminary shallow soil engineering geological investigation should be followed with a SANS634:2012 aligned Phase 1 detailed engineering geological assessment. The information from the flood assessment, wetland assessment and ground elevation survey should be made available to incorporate into the Phase 1 detailed assessment, together with the infill investigation, to refine the preliminary assigned zones provided in this report.

6.2 BIOLOGICAL ENVIRONMENT

6.2.1 Ecological Fauna and Flora Habitat

The following information has been extracted from the Ecological Fauna and Flora Habitat Survey, dated February 2023, undertaken by Anthene Ecological CC. Refer to Appendix C5.

6.2.1.1 Ecological Fauna and Flora Habitat

The site is situated at the Savanna Biome (Mucina & Rutherford 2006). Savanna Biome at the site is represented by the Central Sandy Bushveld vegetation type (Mucina & Rutherford 2006) of which an outline follows.

SVcb 12 Central Sandy Bushveld

Distribution of Central Sandy Bushveld in South Africa: Limpopo, Mpumalanga, Gauteng and North West Provinces: Undulating terrain occurs mainly in a broad arc south of the Springbokvlakte from the Pilanesberg in the west through Hammanskraal and Groblersdal to GaMasemola in the east. A generally narrow irregular band along the north-western edge of the Springbokvlakte (including Modimolle) extending into a series of valleys and lower-altitude areas within the Waterberg including the upper Mokolo River Valley near Vaalwater, the corridor between Rankins Pass and the Doorndraai Dam, and the lowlands from the Mabula area to south of the Hoekberge. Some isolated sandy rises are found on the Springbokvlakte. Altitude about 850 – 1450 m.

Vegetation and Landscape Features: Low undulating areas, sometimes between mountains, and sandy plains and catenas supporting tall, deciduous Terminalia sericea and Burkea africana woodland on deep sandy soils (with the former often dominant on the lower slopes of sandy catenas) and low, broad-leaved woodland on shallow rocky gravelly soils. Species of Acacia, Ziziphus and Euclea are found on flats and lower slopes on eutrophic sands and some less sandy soils. Acacia tortilis may dominate some areas along valleys. Grass-dominated herbaceous layer with relatively low basal cover on dystrophic sands (Mucina & Rutherford, 2006).

6.2.1.2 Habitat and vegetation characteristics

Results

Table 4: Outline of main landscape and habitat characteristics of the site

Topography	The area proposed for the development is on gentle slopes (flat), with some undulations in the south where slopes of rocky outcrops enter. Extensive excavations and active channels also interrupt an otherwise relatively flat landscape.
Rockiness	Slopes of rocky ridges enter the southern parts of the site.
Presence of wetlands	No wetlands appear to be present at the proposed site for the development. Non-perennial rivers, with their active channels and riparian zones, are present at the site. Artificial waterbodies, mostly in-channel dams, with groundwalls, are also present at the site. Waters gather at numerous excavations at the site.
Vegetation	Many areas at the site are disturbed, in particular, by extensive excavations. Remaining patches of open savanna contain a diversity of indigenous plant species. Conspicuous indigenous trees at the site are *Combretum zeyheri* (Large-fruited Bushwillow) *Vachellia tortilis* subsp. *heteracantha* (Umbrella Thorn), *Dichrostachys cinerea* (Sicklebush), *Searsia lancea* (Karee), *Searsa leptodictya* (Mountain Karee), *Ziziphus mucronata* (Buffalo Thorn) and *Peltophorum africanum* (African Wattle). *Sclerocarya b*irrea (Marula) is sparsely distributed at the site. Alien invasive trees include *Melia azedarach* (Syringa Berrytree), *Opuntia ficus-indica* (Sweet Prickly Pear), *Jacaranda mimosifolia* (Jacaranda) and *Cereus jamacaru* (Queen of the Night). Aggresive alien invasive shrubs such *as Lantana camara* is also present at the site. Indigenous herbaceous species include *Chascanum h*ederaceum, *Hibiscus pusillus*, *Blepharis integrifolia*, *Cleome maculata* and *Hilliardiella oligocephala*. Indigenous grass species include *Aristida c*ongesta, *Eragrostis lehmanniana*, *Eragrostis rigidior, Heteropogon contortus, Melinis repens* and *Panicum maximum*. Conspicuous exotic weeds at the site *are Flaveria bidentis*, *Tagetes m*inuta (Khaki Weed), *Bidens bipinnata* (Black Jack), *Conyza bonariensis* (Flea Bane) and *Datura species* (Thorn-apples). Riparian vegetation at the site contains the indigenous reed *Phragmites mauritianus*. Other wetland plants such as *Cyperus* species, *Schoenoplectus* species (Cyperaceae),

	Persicaria species (Knot-weeds) and *Juncus* species (Juncaceae) occur along the fringes of the dams and active channels at the site. In many areas the riparian zones are extensively modified or transformed by excavations.
Signs of disturbances	Large parts of the site and particular at the riparian zones have been excavated in the past and it appears increasingly so in recent times. Pylons and roads are also present at the site. Exotic weeds in disturbed areas are also reflections of human induced impacts. Fences have been removed. Groundwalls and artificial waterbodies have been constructed at the site. Informal residences are spreading in the western parts of the site.
Connectivity	Non-perennial rivers and artificial waterbodies as well as slopes of rocky ridges (at the southern parts) at the site are corridors of particular conservation concern.

Plant Species

The Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found in the south eastern parts of the site. This part of the site is avoided in the proposed footprint so that *Searsia gracillima* is not anticipated to be affected.

The declining species *Boophone disticha* occurs at some rocky slopes which are not included in the proposed footprint at the site and therefore unlikely to be impacted.

One protected tree species *Sclerocarya birrea* (Marula Tree) occurs at the site. Only a few Marula trees *(Sclerocarya birrea)* are present at the site and particularly large trees are absent. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

Vertebrates

Mammals

Because the site falls outside reserves, threatened species such as the black rhinoceros *(Diceros bicornis)* and the African wild dog *(Lycaon pictus*) are obviously not present. No smaller mammals of particular high conservation significance are likely to be found on the site as well. The brown hyaena *(Parahyaena brunnea)* could be present at the site from time to time or be resident in the larger area. Brown hyaenas can travel far and also has the ability to survive at or close to urban areas (Skinner & Chimimba, 2005). It is difficult to ascribe a certain part of the site or the larger study area to the brown hyaena or to ascertain whether the species is still present at the site and surrounding areas.

Birds

The site does not appear to form part of any habitat of particular importance for any threatened bird species or any bird species of particular conservation importance.

Reptiles

There appears to be no threat to any reptile species of particular high conservation importance if the site is developed.

Amphibians

No frog species that occur in the Gauteng are red listed as threatened species or near threatened species at present. There appears to be no threat to any amphibian species of particular high conservation importance if the site is developed. Presence of *Pyxicephalus adspersus* (Giant Bullfrog), a species hitherto listed as near threatened is unlikely.

Invertebrates

Butterflies
There appears to be no threat to any butterfly species of particular high conservation importance if the site is developed.

Fruit chafer beetles
There appears to be no threat to listed rare and localized fruit-chafer beetles if the site is developed.

Mygalomoph spiders
There appears to be no threat to the baboon spider species of high conservation significance if the study site is developed.

Scorpions
There appears to be no threat to the rock scorpion species of high conservation priority if the study site is developed.

6.2.1.3 Screening tool (DFFE) and groundtruthing

Possible ecological sensitivities at the site were indicated by a report generated from the screening tool of DFFE. These ecological sensitivities that could possibly/ are present at the site, follow.

Animal species theme sensitivity
Relative animal species theme sensitivity is high at an area associated with the larger dam at the northern parts of the site, as well as the southeastern part of the site. For the larger part of the site the animal species theme sensitivity is medium. At the northwestern part of the site a low animal species theme sensitivity is listed. The avifaunal species *Tyto capensis*, *Mycteria ibis, Podica senegalensis, Hydroprogne caspia* and *Eupodotis senegalensis*, the mammal species *Dasymys robertsii* and *Neamblysomus julianae* as well as the reptile species *Kinixys lobatsiana* are flagged for the site area. The African Grass-owl, *Tyto capensis* often occurs in treeless areas associated with damp substrata, mainly marshes and vleis (Hockey, Dean & Ryan, 2005). *Tyto capensis* favours patches of tall, rank grass, sedges or weeds (Armstrong, 1991). Roost sites can develop into "caves" in grass that are interconnected by tunnels and open landing platforms (Hockey, Dean & Ryan, 2005). No signs of *Tyto capensis* that inhabits the site were observed. It appears unlikely based on the habitat at the site that *Tyto capensis* would be present. The habitat of the Yellow-billed Stork, *Mycteria ibis*, comprises wetlands, including alkaline and freshwater lakes, rivers, dams, flooded grassland and small pools or streams, less often marine mudflats and estuaries (Hockey, Dean & Ryan, 2005). *Mycteria ibis* is widespread over most of sub-Saharan Africa but in southern Africa largely absent from the Namib Desert, Kalahari Basin and Karoo (Hockey, Dean & Ryan, 2005). While *Mycteria ibis* could visit the site there is no distinct indication that the site would impact the species. The African Finfoot, *Podica senegalensis*, mostly occurs at quiet, wooded streams and rivers, flanked by thick riparian vegetation and overhanging trees (Hockey, Dean & Ryan, 2005). Presence of *Podica senegalensis* at the site is unlikely. The Caspian Tern, *Hydroprogne caspia* is found worldwide apart from South America and Antarctica. In southern Africa *Hydroprogne caspia* occurs around entire coast and inland in Botswana, central-eastern South Africa and southern Mozambique (Hockey, Dean & Ryan, 2005). Along the coast *Hydroprogne caspia* is present mostly in sheltered bays and estuaries. Inland in southern Africa *Hydroprogne caspia* occurs at large waterbodies, natural and man-made, with preference for saline pans and large impoundments (Hockey, Dean & Ryan, 2005). Inland the species breeds on small, low islets in pans and dams (Hockey, Dean & Ryan, 2005). The white-bellied bustard, *Eupodotis senegalensis*, is patchily distributed in the Afrotropics from western Africa to South Africa. The subspecies that occurs in South Africa is near-endemic of which many populations appear to be localized. The habitat of *Eupodotis senegalensis* comprises fairly tall, dense grassland, especially sour and mixed grassland, in open or lightly wooded, undulating to hilly country (Hockey, Dean & Ryan, 2005). No *Eupodotis senegalensis* has been observed at the site. There is no distinct reason why *Eupodotis senegalensis* would occur at the site.

Juliana's Golden Mole, *Neamblysomus julianae*, has been recorded at widely separated localities in South Africa in the past which includes Pretoria, the Nyl floodplain and the Pretoriuskop area of the Kruger National Park (Skinner & Chimimba, 2005). *Neamblysomus julianae* is endemic to the Savanna Biome where it is confined to sourish bushveld on sandy soil (Bronner, 1995). At the Pretoria area it occurs at sandy soils with rocky outcrops in the Bronberg (Willlows) area. There are no indications that *Neamblysomus j*ulianae occurs at the site. *Dasymys robertsii* is patchily distributed in the lowveld of northern South Africa and Zimbabwe. In South Africa *Dasymys robertsii* occurs predominantly in the Limpopo, Mpumalanga and Gauteng Provinces (Mullin et. al., 2005). Power (2014) recorded the *D. robertsii* in the North West Province at a tributary of the Waterkloofspruit at Kgaswane. The Lobatse hinged-back tortoise, *Kinixys lobatsiana*, is found in southeastern Botswana and in South Africa from the north-eastern parts of the North West Province, through northern Gauteng, northwestern parts of Mpumalanga and into the Limpopo Province south of the Soutpansberg (Bates et. al., 2014). *Kinixys lobatsiana* is present in savanna habitats, though absent from the subtropical lowveld, and is also absent from the highveld grassland (Bates et. al., 2014). Vegetation at its habitats ranges from dens, short bushveld to open tree savanna. The tortoise species prefers rocky hillsides and rocky ridges (Boycott & Bourquin, 2000). Habitat which could sustain the tortoise appears to exist at the site. No tortoises have been found at the site. There is no distinct indication that the animal species listed above occur on the site. Some vegetation in good condition remains at the rocky ridges at the southern part of the site as well as some patches at the eastern part of the site. The site is increasingly disturbed, negative urban edge effects are present, large-scale groundworks are taking place and the site is increasingly isolated.

Aquatic biodiversity theme sensitivity

Relative aquatic biodiversity theme sensitivity at the site is listed as very high owing to the possible presence of wetlands and estuaries. Riparian zones, in-channel dams and artificial dams (that approaches quarries) were found at the site. Large-scale groundworks at and along the riparian zones and active channels have transformed large areas at the site. The scale to which riparian zones have been destroyed is considerable.

Plant species theme sensitivity

Relative plant species theme sensitivity is low and medium. A species that is prone to harvesting is listed. In this report possible sensitive plant species of which the likely presence or absence have been investigated are listed in Tables 4.2 – 4.9 *(refer to Appendix C5)* and include plant species on a local and provincial scale which could be prone to harvesting. One species that is not threatened but which is a nationally protected tree species, *Sclerocarya birrea*, Marula, has been noted at the site. For most of the site this protected tree is absent or occurs sparingly. An area at the eastern part of the site contains some areas where larger individuals of these protected trees have been found more concentrated. If the development is approved and the removal/ destruction of these *Sclerocarya birrea* (Marula) trees cannot be avoided, a permit should be applied for. A locality for the near threatened plant species, *Searsia gracillima* var. *gracillima* has been found at the southeastern part of the site. This locality (which is possibly new for the species) of *Searsia gracillima* var. *gracillima* underscores the higher sensitivity of the southern part of the site. No Threatened plant species have been flagged for the site area by the screening tool and no Threatened plant species have been found at the site.

Terrestrial biodiversity theme sensitivity

Relative terrestrial biodiversity at the site is very high. This high sensitivity that is ascribed to the site area, is because of the presence of Critical Biodiversity Area 2, the presence of an Ecological Support Area and the presence of the Sterkwater Private Nature Reserve. During surveys at the site, it was found that the original vegetation type has been transformed or modified at large parts of the site. The southern parts of the site where a rocky ridge is also present remained in fairly good condition and warrants conservation. Informal residences entered considerable areas of the western part of the site. Riparian zones at large parts of the site have been largely destroyed and transformed. The functioning of the

Sterkwater Private Nature Reserve is in doubt at present. Fences have been removed. For large parts of the site the ecological integrity appears to be low or medium but not high.

6.2.1.4 Ecological Sensitivity at the site

Ecological sensitivity at most of the site is medium. Some of the terrestrial areas are of low sensitivity where these terrestrial areas have been degraded and transformed by extensive excavations and groundworks as well as informal residences. Ecological sensitivity at the non-perennial rivers, their riparian zones and buffer zones as well as the artificial waterbodies at the site is high (Figure 9). The main reason for the high sensitivity of the active channel and riparian zones is only based on their importance as conservation corridors and not on the poor current state of the active channels and riparian zones. Rocky slopes and their bufferzones at the southwestern parts of the site are also of high ecological sensitivity (Figure 9). The area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found at the site, is of high ecological sensitivity.

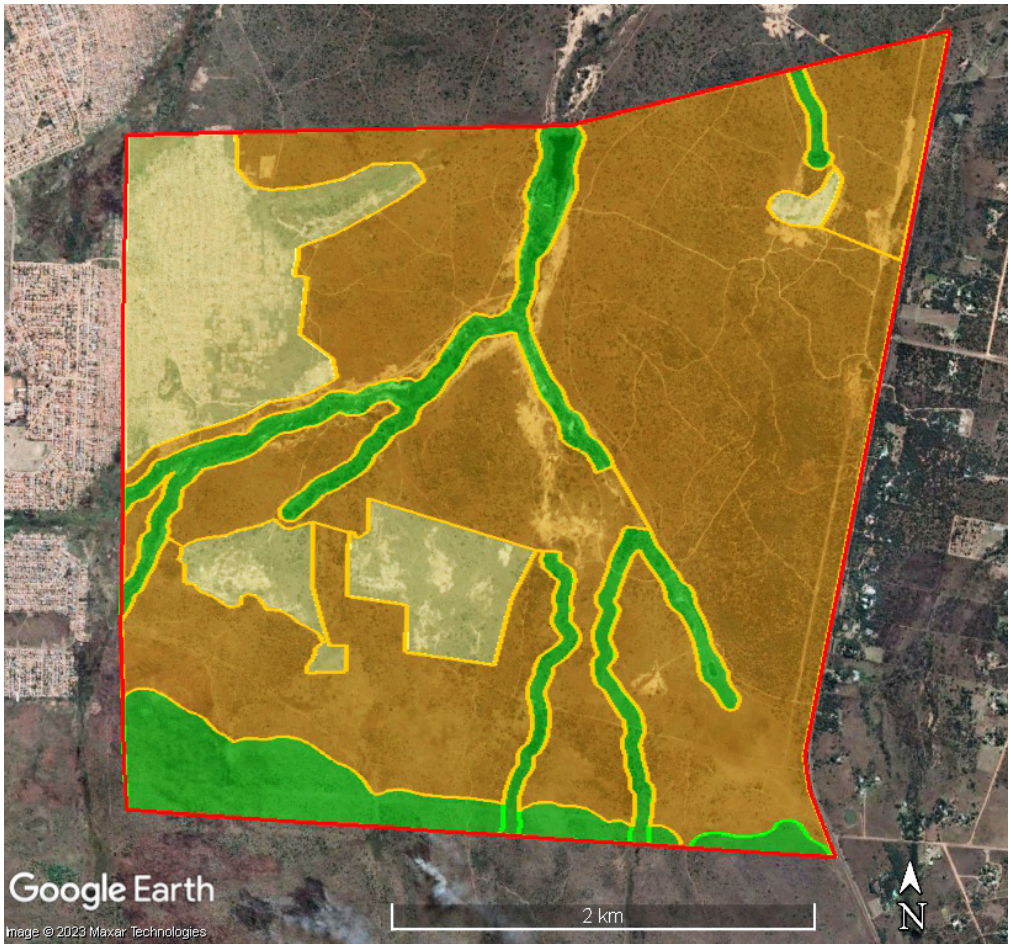


Figure 9: Indications of ecological sensitivity at the site.

Red outline	Boundaries of the site
Light yellow outline and shading	Low Sensitivity
Orange outline and shading	Medium Sensitivity
Green outline and shading	High Sensitivity

6.2.1.5 Risks, Impacts and Mitigation

Background:

Habitats of threatened plants are in danger most often due to urban developments such as is the case for the Gauteng Province (Pfab & Victor, 2002). Habitat conservation is the key to the conservation of invertebrates such as threatened butterflies (Deutschländer and Bredenkamp 1999; Edge 2002, 2005; Terblanche, Morgenthal & Cilliers 2003; Lubke, Hoare, Victor & Ketelaar 2003; Edge, Cilliers & Terblanche, 2008). Furthermore, corridors and linkages may play a significant role in insect conservation (Pryke & Samways, 2003, Samways, 2005).

Urbanisation is a major additional influence on the loss of natural areas (Rutherford & Westfall 1994). In South Africa the pressure to develop areas are high since its infrastructure allows for improvement of human well-being. Urban nature conservation issues in South Africa are overshadowed by the goal to improve human well-being, which focuses on aspects such as poverty, equity, redistribution of wealth and wealth creation (Cilliers, Müller & Drewes 2004). Nevertheless, the conservation of habitats is the key to invertebrate conservation, especially for those threatened species that are very habitat specific. This is also true for any detailed planning of corridors and buffer zones for invertebrates. Though proper management plans for habitats are not in place, setting aside special ecosystems is in line with the resent Biodiversity Act (2004) of the Republic of South Africa.

Corridors are important to link ecosystems of high conservation priority. Such corridors or linkages are there to improve the chances of survival of otherwise isolated populations (Samways, 2005). How wide should corridors be? The answer to this question depends on the conservation goal and the focal species (Samways, 2005). For an African butterfly assemblage this is about 250m when the corridor is for movement as well as being a habitat source (Pryke and Samways 2003). Hill (1995) found a figure of 200m for dung beetles in tropical Australian forest. In the agricultural context, and at least for some common insects, even small corridors can play a valuable role (Samways, 2005). Much more research remains to be done to find refined answers to the width of grassland corridors in South Africa. The width of corridors will also depend on the type of development, for instance the effects of the shade of multiple story buildings will be quite different from that of small houses.

To summarise: In practice, as far as developments are concerned, the key would be to prioritise and plan according to sensitive species and special ecosystems.

In the case of this study:

Many areas at the site are disturbed, in particular, by extensive excavations. Remaining patches of open savanna contain a diversity of indigenous plant species. Alien invasive trees and herbaceous weeds are noticeable at ecologically disturbed areas in particular at areas where excavations took place in the past.

No wetlands appear to be present at the site proposed for the development. Non-perennial rivers, with their active channels and riparian zones, are present at the site. Artificial waterbodies, mostly in-channel dams, with groundwalls, are also present at the site. Water gather at numerous excavations at the site. Riparian vegetation at the site contains the indigenous reed *Phragmites mauritianus*. Other wetland plant species such as *Cyperus* species, *Schoenoplectus* species *(Cyperaceae), Persicaria* species (Knot-weeds) and *Juncus species* (Juncaceae) occur along the fringes of the dams and active channels at the site. In many areas the riparian zones are extensively modified or transformed by removing vegetation and soil as part of extensive excavations and groundworks.

Slopes of rocky ridges enter the southern parts of the site.

One protected tree species *Sclerocarya birrea* (Marula), is sparsely distributed at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or

destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

Apart from the above Protected plant species no loss of sensitive species is anticipated. The habitat of the Near Threatened plant species *Searsia gracillima* var. *gracillima* is avoided in the proposed footprint.

Though the riparian zones and active channels (of non-perennial rivers) are modified and transformed in many areas they remain important conservation corridors. A rehabilitation plan and actions are strongly recommended. In the case of this site the 32 m buffer zone may not be practical at all areas.

If the development is approved a key aim should be to cultivate indigenous vegetation at the site and in particular at any corridors.

The following potential risks, impacts and mitigation measures apply to the proposed development:

Identification of potential impacts and risks

The potential impacts identified are:

Construction Phase

- Potential impact 1: Loss of habitat owing to the removal of vegetation at the proposed development.
- Potential impact 2: Loss of sensitive species (Threatened, Near Threatened, Rare, Declining or Protected species) during the construction phase.
- Potential impact 3: Loss of connectivity and conservation corridor networks in the landscape.
- Potential impact 4: Contamination of soil during construction in particular by hydrocarbon spills.
- Potential impact 5: Killing of vertebrate fauna during the construction phase.

Operational Phase

- Potential impact 6: An increased infestation of exotic or alien invasive plant species owing to disturbance.

Potential impacts and risks during the construction phase

Classes of impacts for this study: Very High, High, Moderate, Low, Very Low

Aspect/Activity	Clearance of vegetation at part of the site for the development
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Clearing of vegetation at the proposed development. This will entail the partial destruction of habitat of medium to low ecological sensitivity.
Status	Negative
Mitigation Required	Active channels and riparian zones with 32 m bufferzone are excluded from the development. Artificial waterbodies and 32 m bufferzones are excluded from the development.
Impact Significance (Pre-Mitigation)	High
Impact Significance (Post-Mitigation)	Low
RISK	Following the mitigation measures a low risk of impact is expected.

Aspect/Activity	Removal of sensitive species
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Sensitive species: Presence of Threatened or Near-Threatened Plants, Mammals, Reptiles, Amphibians and Invertebrates at the site appear to be unlikely. A protected (but not threatened) tree species *Sclerocarya birrea* (Marula) is present at the site.
Status	Negative.
Mitigation Required	Mitigation measures for protected tree species:

	• A permit at the relevant authorities should be applied for in case of any damage or removal of individual trees of *Sclerocarya birrea* (Marula) trees, if the development is approved.
Impact Significance (Pre-Mitigation)	Moderate
Impact Significance (Post-Mitigation)	Low
RISK	If permit application procedure for protected trees and some trees are retained, the risk of significant impact is low.

Aspect/Activity	Fragmentation of corridors of particular conservation concern
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	While there is little scope for most of the site to be part of a corridor of particular conservation importance. Though the riparian zones and active channels (of non-perennial rivers) are modified and transformed in many areas they remain important conservation corridors.
Status	Negative
Mitigation Required	Active channels and riparian zones with 32 m bufferzones are excluded from the development. Small artificial waterbody and 32 m bufferzones are excluded from the development.
Impact Significance (Pre-Mitigation)	High
Impact Significance (Post-Mitigation)	Low
RISK	Following mitigation a low impact risk is expected.

Aspect/Activity	Contamination of soil by leaving rubble/ waste or spilling petroleum fuels or any pollutants on soil which could infiltrate the soil
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Rubble or waste could lead to infiltration of unwanted pollutants into the soil. Spilling of petroleum fuels and unwanted chemicals onto the soils that infiltrate these soils could lead to pollution of soils.
Status	Negative
Mitigation Required	Rubble or waste that could accompany the construction effort, if the development is approved, should be removed during and after construction. Measures should be taken to avoid any spills and infiltration of petroleum fuels or any chemical pollutants into the soil during construction phase.
Impact Significance (Pre-Mitigation)	Moderate
Impact Significance (Post-Mitigation)	Low
RISKS	A low risk is expected following mitigation.

Aspect/Activity	Possible disturbance, trapping, hunting and killing of vertebrates during construction phase
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	During the construction phase animal species could be disturbed, trapped, hunted or killed.
Status	Negative
Mitigation Required	If the development is approved, contractors must ensure that no animal species are disturbed, trapped, hunted or killed during the construction phase.
Impact Significance (Pre-Mitigation)	Moderate
Impact Significance (Post-Mitigation)	Low
RISKS	Following mitigation a low risk is anticipated.

Potential impacts during the operational phase

Aspect/Activity	An increased infestation of exotic or alien invasive plant species owing to clearance or disturbance where the footprint took place.
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Infestation by alien invasive species could replace indigenous vegetation or potential areas where indigenous vegetation could recover. It is in particular declared alien invasive species such as *Melia* azedarach (Syringa) or alien invasive Australian *Acacia* species (Australian Wattles) that should not be allowed to establish. Once established these combatting these alien invasive plant species may become very expensive in the long term.
Status	Negative
Mitigation Required	Continued monitoring and eradication of alien invasive plant species are imperative. It is in particular declared alien invasive species such as *Melia azedarach* (Syringa) and alien invasive Australian *Acacia* species (Australian wattles) that should not be allowed to establish.
Impact Significance (Pre-Mitigation)	Moderate
Impact Significance (Post-Mitigation)	Low
RISKS	Following mitigation, a low risk is anticipated.

Table 5: Risk and impact assessment summary for the construction phase

Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)	
Clearing of vegetation	Habitat loss, loss of indigenous species	Negative	Part of site	Long-Term	Substantial	Very likely	Low	Low	Keep disturbance to less sensitive area. Avoid non-perennial rivers and their buffer zones. Avoid artificial waterbodies and their buffer zones.	High	Moderate	High
Loss of sensitive species	Loss of sensitive species (Note no Threatened species or Near-threatened species)	Negative	Site	Long-Term	Very low (No species anticipated)	Unlikely	Not applicable	Not applicable	Permit application for protected tree species and retention of some of the protected trees at some areas.	Moderate	Low	High
Loss of corridors of particular conservation concern	Fragmentation of landscape and loss of connectivity	Negative	Site	Long-Term	Moderate	Unlikely	Moderate	Moderate	Demarcate and avoid riparian zones and buffer zone. Demarcate and avoid artificial waterbodies and and buffer zones.	High	Low	High
Contamination of soil by spilling pollutants on soil which could infiltrate the soil	Soil contamination	Negative	Site	Long-Term	Moderate	Unlikely	Moderate	Moderate	Rubble and waste removal. Measures that avoid hydrocarbon (petroleum) spills to get into contact with the soil.	Moderate	Low	High
Disturbance or killing of vertebrates	Disturbance or killing of species	Negative	Site	Long-Term	Moderate	Unlikely	Moderate	Moderate	If the development is approved, contractors must ensure that no animal species are disturbed, trapped, hunted or killed during the construction phase.	Moderate	Low	High

Table 6: Risk/ Impact assessment summary for the operational phase

Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)	
Increased infestation of exotic or alien invasive plant species	Loss of habitat quality	Negative	Site	Long-Term	Substantial	Likely	Moderate	Moderate	Monitoring and eradication of alien invasive plant species	High	Low	High

6.2.1.6 Summary of risks and impacts

Many areas at the site are disturbed, in particular, by extensive excavations. Remaining patches of open savanna contain a diversity of indigenous plant species. No wetlands appear to be present at the proposed site for the development. Non-perennial rivers, with their active channels and riparian zones, are present at the site. Artificial waterbodies, mostly in-channel dams, with groundwalls, are also present at the site. Water gathers at numerous excavations at the site. Riparian vegetation at the site contains the indigenous reed *Phragmites mauritianus.* Other wetland plant species such as *Cyperus species, Schoenoplectus* species *(Cyperaceae), Persicaria* species (Knot-weeds) and *Juncus* species (Juncaceae) occur along the fringes of the dams and active channels at the site. In many areas the riparian zones are extensively modified or tranformed by clearing of vegetation by groundworks and excavations. Slopes of rocky ridges enter the southern parts of the site.

One protected tree species *Sclerocarya birrea* (Marula), is sparsely distributed at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. Apart from the above Protected plant species no loss of sensitive species is anticipated. The habitat of the Near Threatened plant species *Searsia gracillima* var. *gracillima* is avoided in the proposed footprint. No Threatened animal- or plant species are present at the site.

Though the riparian zones and active channels (of non-perennial rivers) are modified and transformed in many areas they remain important conservation corridors. A rehabilitation plan and actions are strongly recommended. In the case of this site the 32 m buffer zone may not be practical at all areas.

If the development is approved a key aim should be to cultivate indigenous vegetation at the site and in particular at any corridors.

Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate, low or very low.

6.2.1.7 Conclusion

- Extensive excavations and groundworks have transformed large parts of the site including areas at and along the riparian zones at the site. The extent of these excavations and groundworks are beyond comprehension and would warrant an investigation beyond the scope of the Ecological Habitat report.
- Informal settlements are spreading in the north-western part of the site.
- The degradation of the site is not only clearly visible on land but also in a comparison of Google Earth Pro images of the past (2004) and at present (2023) (Figure 10 and Figure 11 below).
- Informal dumping has visibly increased in recent years.
- Fences have currently been taken away at the site. Cattle roam at parts of the site. Signs of larger vertebrates such as megaherbivores, appear to have decreased and the presence of larger game at the site, currently, is uncertain. The functioning of the Sterkwater Nature Reserve is in doubt.
- Remaining patches of open savanna contain a diversity of indigenous plant species.
- No wetlands appear to be present at the proposed site for the development. Non-perennial rivers, with their active channels and riparian zones, are present at the site. Artificial waterbodies, mostly in-channel dams, with groundwalls, are also present at the site. Water gathers at numerous excavations at the site. Large scale removal of soil modified or transformed large parts of the active channels and riparian zones of the non-perennial river systems at the site.
- Site is part of the Crocodile (West) and Marico Water Management Area (WMA 3). The site is not part of a Freshwater Ecosystem Priority Area (FEPA) or wetland cluster (Nel et al., 2011a, 2011b).
- Slopes of rocky ridges at the southern parts of the site contains vegetation in fairly good condition, with a diversity of indigenous plant species. Slopes of rocky ridges which enter the southern parts of

the site are excluded from the proposed footprint and forms part of a conservation area at the site and south of the site which is imperative and to be commended.

- The site is part of the savanna vegetation type, Central Sandy Bushveld (SVcb 12) which is not listed as threatened according to the National List of Threatened Ecosystems (2011).
- No Threatened animal- or plant species appear to be resident at the site.
- The Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found in the south-eastern parts of the site. This part of the site is avoided in the proposed footprint so that *Searsia gracillima* is not anticipated to be affected.
- The brown hyaena *(Parahyaena brunnea)* could be present at the site from time to time or be resident at the larger area. Brown hyaenas can travel far and also has the ability to survive at or close to urban areas (Skinner & Chimimba, 2005). It is difficult to ascribe a certain part of the site or the larger study area to the brown hyaena or to ascertain whether the species is still present at the site and surrounding areas. No distinct threat to the brown hyaena is anticipated if the development is approved.
- The declining species *Boophone disticha* occurs at some rocky slopes which are not included in the proposed footprint at the site and therefore unlikely to be impacted.
- One protected tree species *Sclerocarya birrea* (Marula), is sparsely distributed at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.
- A permit at the relevant authorities should be applied for in case of any damage or removal of individual trees of *Sclerocarya birrea* (Marula) trees, if the development is approved.
- Apart from the above Protected plant species no loss of sensitive species is anticipated if the development is approved according to a footprint that excludes the slopes of rocky ridges that enter the southern parts of the site as well as the area at southeastern part of the site where the Near Threatened plant species *Searsia gracillima* var. *gracillima* is found.
- Possible ecological sensitivities at the site were indicated by a report generated from the screening tool of DFFE. These ecological sensitivities that could possibly/ are present at the site are as follow:
    - *Animal species theme sensitivity*
    - *Aquatic biodiversity theme sensitivity*
    - *Plant species theme sensitivity*
    - *Terrestrial biodiversity theme sensitivity*
- Though the riparian zones and active channels (of non-perennial rivers) are modified and transformed in many areas they remain important conservation corridors. A rehabilitation plan and actions are strongly recommended.
- Ecological sensitivity at most of the site is medium. The ecological sensitivity at increasingly larger parts of the site is low. Some of the terrestrial areas are of low sensitivity where these terrestrial areas have been degraded and transformed by extensive excavations and groundworks as well as informal residences. Ecological sensitivity at the non-perennial rivers, their riparian zones and buffer zones as well as the artificial waterbodies at the site is high (Figure 9). The main reason for the high sensitivity of the active channel and riparian zones is only based on their importance as conservation corridors and not on the poor current state of the active channels and riparian zones. Rocky slopes and their bufferzones at the southwestern parts of the site are also of high ecological sensitivity (Figure 9). The area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found at the site, is of high ecological sensitivity.
- Reconstruction of active channels and riparian zones are imperative in many areas. Where the active channel routes have been destroyed these should be reconstructed to link the riparian systems at the site.
- In the case of this site a 32 m buffer zone is recommended.

- If the development is approved a key aim should be to cultivate indigenous vegetation at the site and in particular at conservation corridors.
- Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate, low or very low.

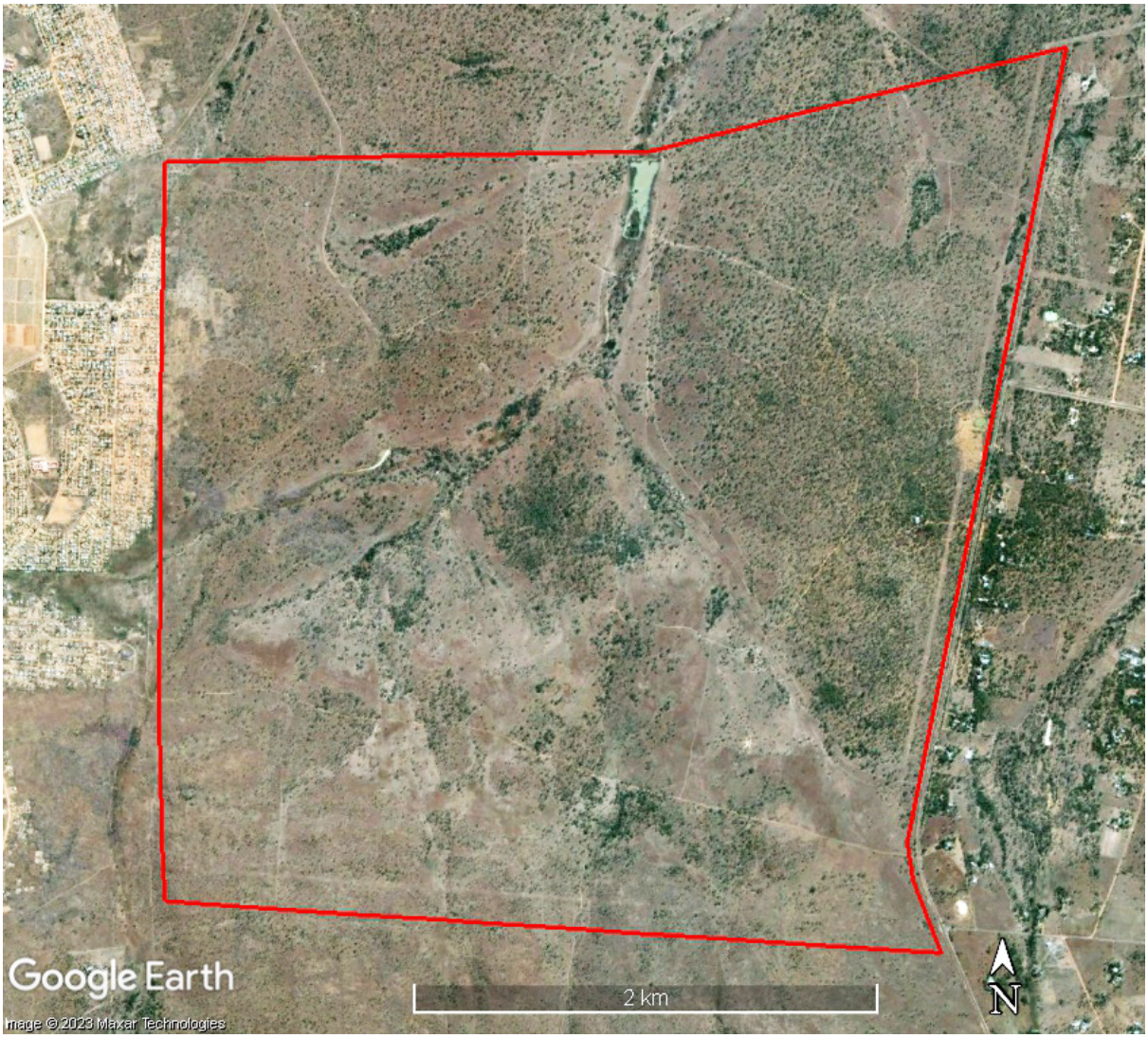


Figure 10: Google Earth Pro map of the study area for June 2004

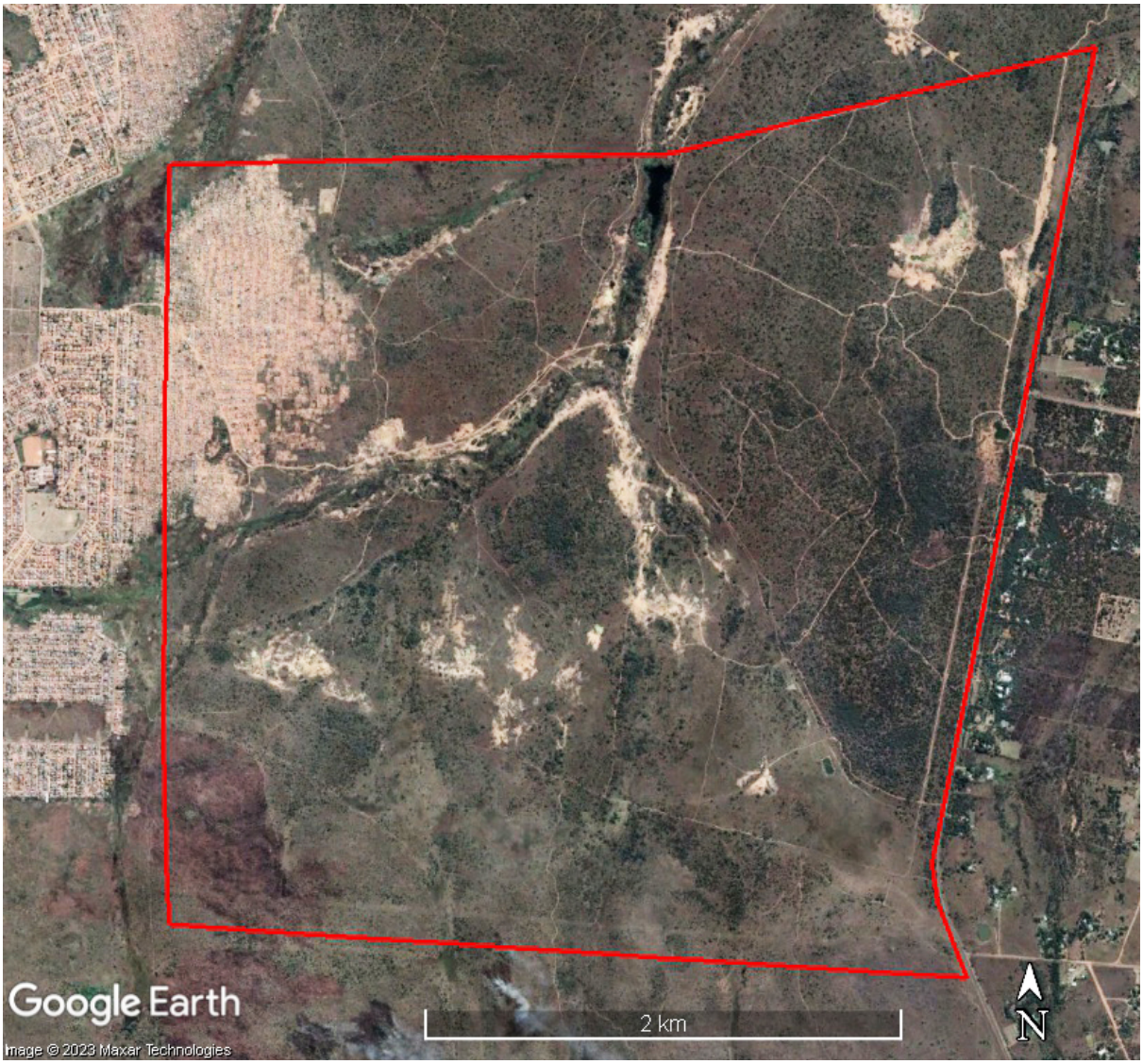


Figure 11: Google Earth Pro map of the study area for February 2023. Informal residential areas are spreading increasingly into the northeastern parts of the site. Extensive excavations and groundworks are taking place at many parts of the site including at the active channels and riparian zones.

6.2.2 Wetland and Riparian Assessment

The following information has been extracted from the Wetland and Riparian Assessment, dated February 2023, undertaken by Reinier Terblanche. Refer to Appendix C6.

6.2.2.1 Assessment of presence of wetlands at the site

No wetlands appear to be present at the proposed site for the development.

Wetlands such as floodplain wetlands, channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, depressions, seeps and wetland flats appear to be absent at the site. In conclusion no wetlands are found at the site.

Refer to the figures below for an indication of the non-perennial rivers (active channels, riparian zones), dams and excavations at the site.

Informal residential areas are spreading increasingly into the northeastern parts of the site. Extensive excavations and groundworks are taking place at many parts of the site including at the active channels and riparian zones as indicated in Figure 12.

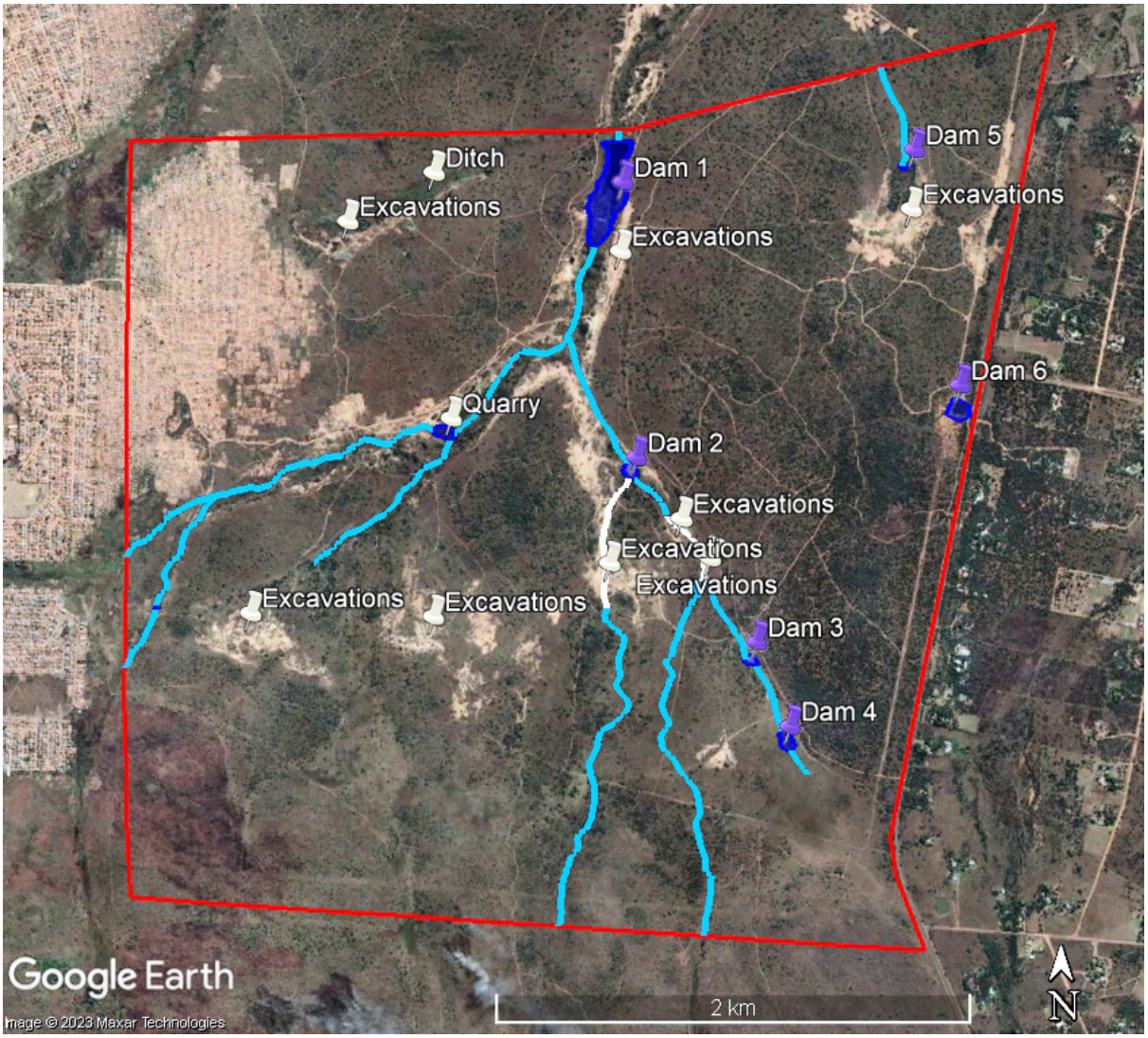


Figure 12: Indication of non-perennial rivers (active channels, riparian zones), dams and excavations at the site.

Light blue outline	Route of active channel at the site
Dark blue outline and shading	Artificial waterbodies (excavated or with groundwall)
Green outline and shading	Riparian zone

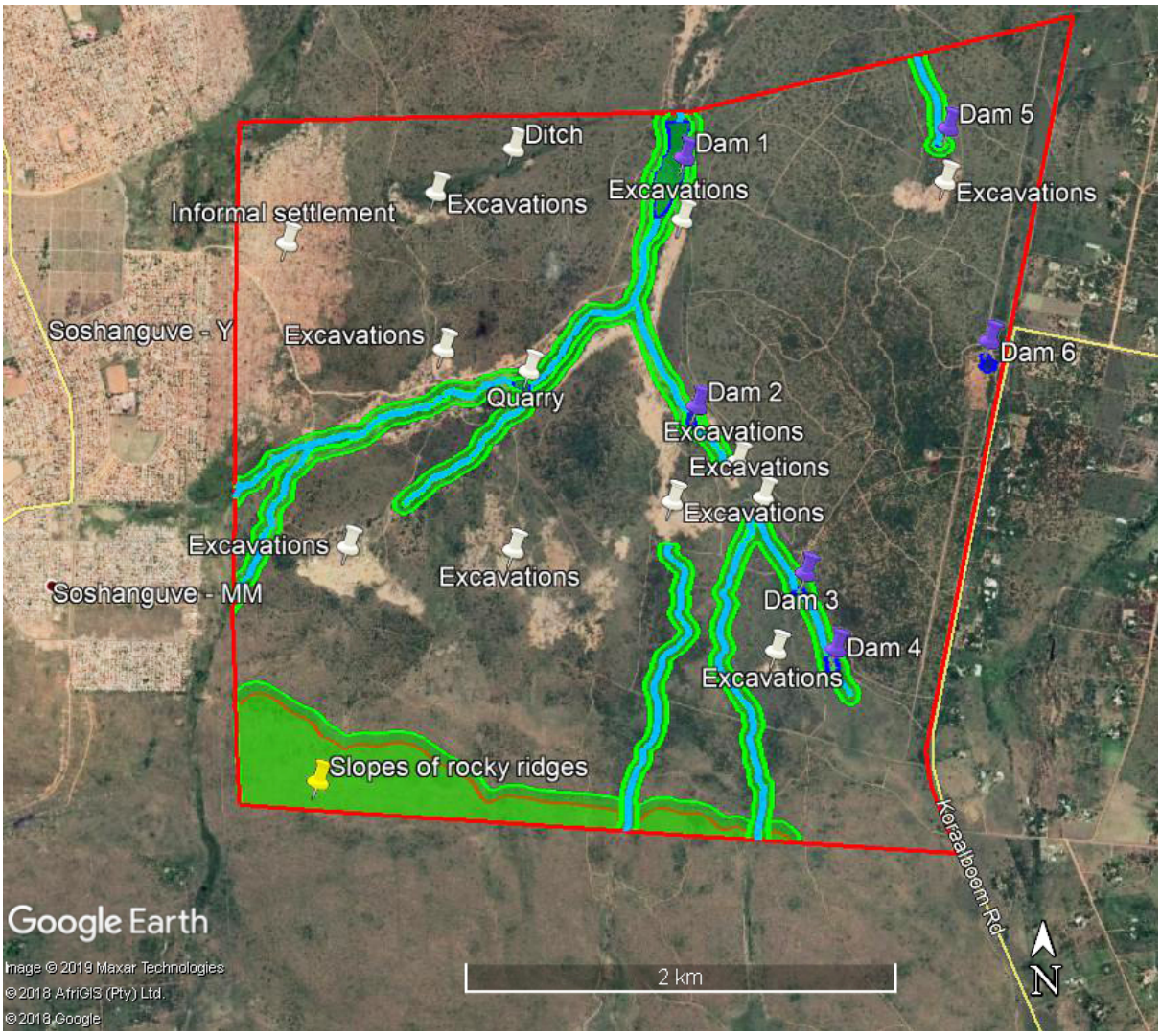


Figure 13: Indication of non-perennial rivers (active channels, riparian zones), dams and excavations at the site. Rocky slopes that enter the southwestern parts of the site are also depicted. An indication is also given of the buffer zones of the riparian areas as well as where the slopes of rocky ridges enter the site.

Light blue outline	Route of active channel at the site
Dark blue outline and shading	Artificial waterbodies (excavated or with groundwall)
Green outline and shading	Buffer Zone

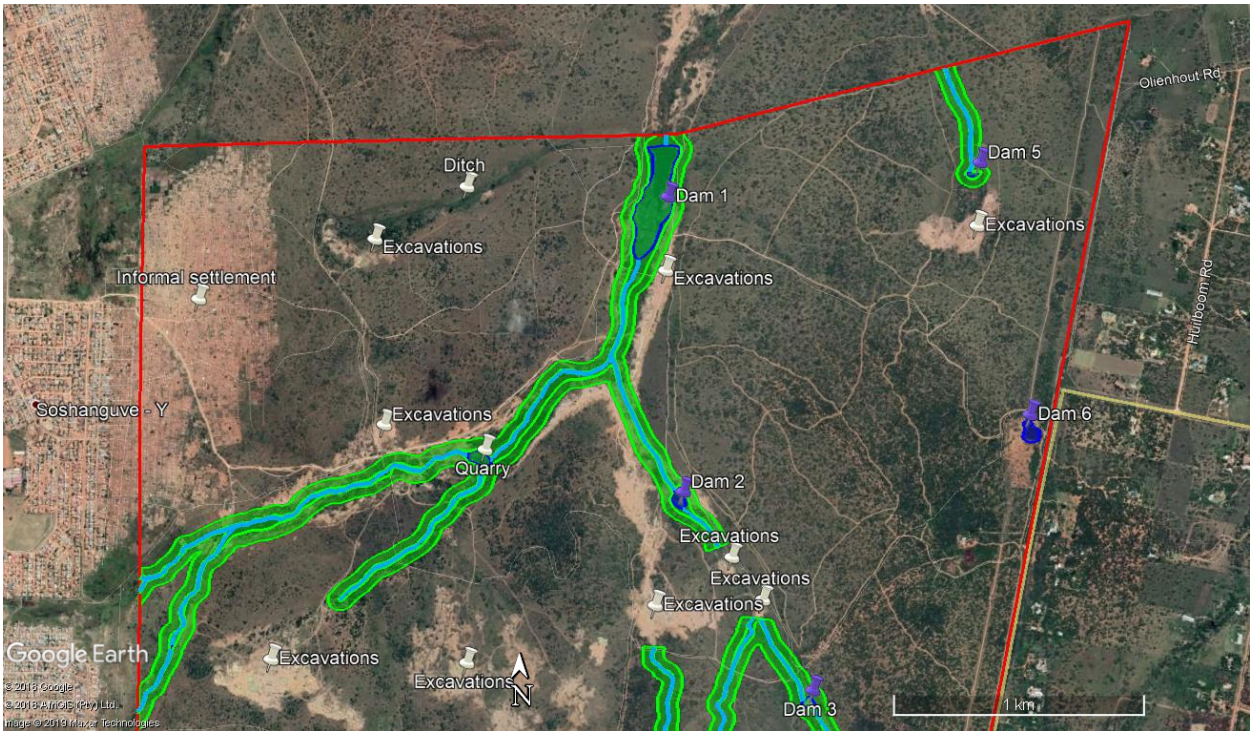


Figure 14: Indication of non-perennial rivers (active channels, riparian zones), dams and excavations at the northern parts of the site. An indication is also given of the buffer zones of the riparian areas.

Light blue outline	Route of active channel at the site
Dark blue outline and shading	Artificial waterbodies (excavated or with groundwall)
Green outline and shading	Buffer Zone

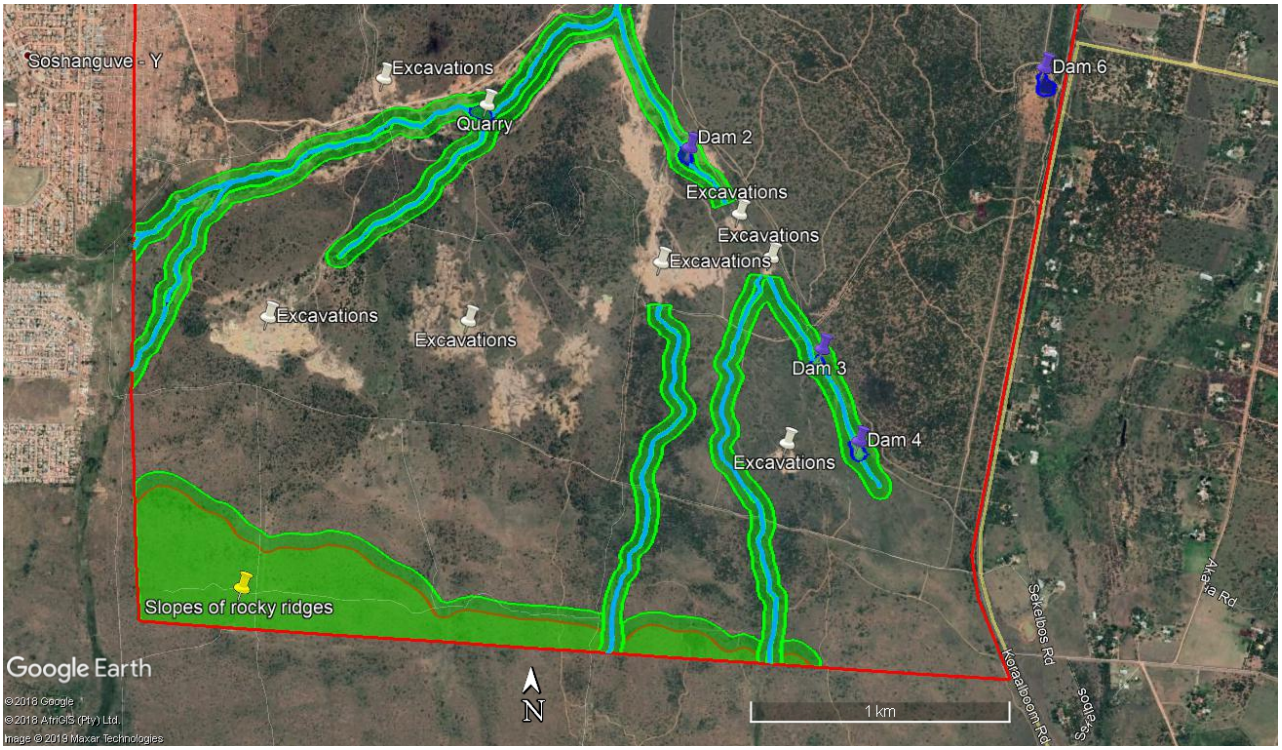


Figure 15: Indication of non-perennial rivers (active channels, riparian zones), dams and excavations at the southern parts of the site. Rocky slopes that enter the southwestern parts of the site are also depicted. An indication is also given of the buffer zones of the riparian areas as well as where the slopes of rocky ridges enter the site.

Light blue outline	Route of active channel at the site
Dark blue outline and shading	Artificial waterbodies (excavated or with groundwall)
Green outline and shading	Buffer Zone

Figure 16: Google Earth Pro map of a central-western part of the site where excavations and transformation of ecosystems at the site have been extensive. Grid reference coordinates are given as a reference point. The catchment and hydrological regime are transformed at a very large scale at many parts of the site, including riparian zones.

Figure 17: Google Earth Pro map of a central-eastern part of the site where excavations and transformation of ecosystems at the site have been extensive. Grid reference coordinates are given as a reference point. The catchment and hydrological regime at the site are transformed at a very large scale at many parts of the site.

6.2.2.2 Presence of non-perennial rivers and artificial waterbodies (dams)

Non-perennial rivers, with their active channels and riparian zones, are present at the site. Artificial waterbodies, mostly in-channel dams, with groundwalls, are also present at the site. Water gathers at numerous excavations at the site (Figures 16 and 17). An assessment of the present ecological state (PES) and ecological importance and sensitivity (EIS) follows. The watercourses have been grouped together where the PES and EIS are similar or part of one unit.

Non-perennial rivers (with active channel and riparian zones) and in-channel dams at the site

Non-perennial rivers (tributaries of the Tshwane-river system) with small in-channel dams (Dam 2, Dam 3, Dam 4 and Dam 5) are present at the site. These non-perennial rivers consist of active channels and riparian zones that have been transformed or modified at many areas along the watercourses.

Riparian zones have distinctive characteristic vegetation which is often visibly distinct from the surrounding vegetation. It is often clearly adapted to different levels of frequency and inundation and distributed accordingly within the broad riparian zone. The more water loving, or mesic species are therefore located close to the river channel, while species which are less dependent on water are located further away. It is the ability of species to tolerate different levels of inundation, the need for excessive water availability, or the need for close river proximity for growth, propagation, temperature control and nutrient enrichment which clearly determinate the structural, compositional, and functional characteristics of riparian zones (Kemper, 2001).

The riparian zones at the tributaries at the site are modified and transformed to a very large scale. Extensive removal of vegetation and soils and numerous excavations are present. At some parts the active channel and riparian zone of the tributaries are difficult to follow, and the connectivity broken up. Patches of vegetation along the riparian zones contain the indigenous reed *Phragmites mauritianus*. Other wetland plants such as *Cyperus* species, *Schoenoplectus* species (Cyperaceae), *Persicaria* species (Knot-weeds) and *Juncus* species *(Juncaceae).*

Present ecological status (PES) of the non-perennial rivers at the site is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive *(Refer to Table 4.2 and Table 4.3, Appendix C6).* Ecological Importance and Sensitivity (EIS) of the non-perennial rivers at the site is Category C which is Moderate and refers to watercourses that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers *(Refer to Table 4.4 and Table 4.5, Appendix C6).*

In-channel dam, Dam 1 at the northern boundary of the site

An artificial waterbody, an in-channel dam, Dam 1, is present at the southern side of the northern boundary of the site. This dam is the largest of the dams at the site and could possibly still be an important area for waterbirds though the disturbances at and near the dam increased extensively over the past decade. Its functioning as a recreational area that harbours a number of waterbirds and one which could be visited by bird enthusiasts and tourists are at present in doubt.

Extensive removal of vegetation and soils is present near Dam 1. Patches wetland plants such as *Cyperus* species, *Schoenoplectus* species *(Cyperaceae), Persicaria* species (Knot-weeds) and *Juncu*s species (Juncaceae) are present. Some indigenous trees also remained at the riparian zone.

Present ecological status (PES) of Dam 1 at the site is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive *(refer to*

Table 4.7 and Table 4.8 Appendix C6). Ecological Importance and Sensitivity (EIS) of Dam 1 at the site is Category C which is Moderate and refers to watercourses that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers *(refer to Table 4.9 and Table 4.10, Appendix C6).*

Artificial waterbody Dam 6 that possibly originated from a quarry

Dam 6 which could possibly be a quarry, is found at the eastern parts of the site. This dam is inherently transformed and modified. Riparian vegetation along the fringe of the dam is poorly developed. Many bare areas exist around the dam. Patches of a wetland plant species *Persicari*a species (Knot-weeds) are found at some places. Informal dumping has been occurring increasingly in recent years at Dam 6.

Present ecological status (PES) of Dam 6 is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive *(refer to Table 4.12 and Table 4.13 Appendix C6).* Ecological Importance and Sensitivity (EIS) of the non-perennial rivers at the central- and northern parts of the site is Category D which is Low/Marginal and refers to watercourses that are not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers *(refer to Table 4.14 and Table 4.15, Appendix C6).*

6.2.2.3 Impacts, mitigation and rating of risks

Identification of potential impacts and risks

The potential impacts identified are:

Construction Phase

- Potential impact 1: Loss of riparian habitat owing to the removal of vegetation at the proposed footprint for development.
- Potential impact 2: Changes in flow regime.
- Potential impact 3: Exposure of soil leading to soil compaction and/ or erosion.
- Potential impact 4: Loss of sensitive wetland/ riparian species (Threatened, Near Threatened, Rare, Declining or Protected species) during the construction phase.
- Potential impact 5: Loss of riparian connectivity and conservation corridor networks in the landscape.
- Potential impact 6: Contamination of riparian soil during construction in particular by hydrocarbon spills.
- Potential impact 7: Contamination of habitat by littering and dumping of rubble/ construction material.

Operational Phase

- Potential impact 8: An increased infestation of exotic or alien invasive plant species owing to disturbances associated with the proposed development.
- Potential impact 9: Poor recovery of soils that were exposed and compacted during the construction phase.

Site specific considerations of risks and impacts

Large scale removal of vegetation and soils have taken place at the site. Note the Google Earth Pro Map comparison of the situation in 2004 compared to 2023 (Figure 10, Figure 11). While the ecological integrity of the active channels and riparian zones have been degraded at a large scale, these non-perennial rivers with their artificial waterbodies (dams) remain important corridors in the larger areas.

The developer has considered the sensitive watercourse features and associated buffers recommended and has further ensured avoidance by considering 32 m buffers proposed in this report. This is considered to reduce the risk of impact to the sensitive features and is considered as an opportunity for further mitigation and reduction in the significance of the expected impact.

Riparian vegetation and habitat

Climate at the vegetation types of which site is part comprises summer rainfall with very dry winters. Mean annual precipitation from about 500 mm to 700 mm. The implications of the climate are that construction could take place at the non-perennial streams at a certain time of the year when there is a high probability that temporary diverting the stream would not be necessary. For much of the time the active channels could be dry.

Present ecological status (PES) of the non-perennial rivers at the site is CATEGORY E which means the watercourses are seriously modified. The losses of natural habitats and basic ecosystem functions are extensive *(refer to Table 4.2 and Table 4.3 Appendix C6).* Ecological Importance and Sensitivity (EIS) of the non-perennial rivers at the is Category C which is Moderate and refers to watercourses that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers *(refer to Table 4.4 and Table 4.5, Appendix C6).*

Present ecological status (PES) of Dam 1 at the site is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive *(refer to Table 4.7 and Table 4.8 Appendix C6).* Ecological Importance and Sensitivity (EIS) of Dam 1 at the site is Category C which is Moderate and refers to watercourses that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers (refer to Table 4.9 and Table 4.10 Appendix *C6*).

Present ecological status (PES) of Dam 6 is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive *(refer to Table 4.12 and Table 4.13 Appendix C6)*. Ecological Importance and Sensitivity (EIS) of the non-perennial rivers at the central- and northern parts of the site is Category D which is Low/Marginal and refers to watercourses that are not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers (refer to Table 4.14 and Table 4.15 Appendix *C6*).

Flow Regime

The non-perennial rivers at the site, with in-channel dams, their riparian zones and buffer zones, are likely to be impacted by the proposed developments, but to a very limited extent by road- and bridge crossings. If the development is approved the construction should be planned in such a manner that surface flow function well while erosion is limited. There is no distinct indication that interflow plays an important role in the maintenance of the non-perennial rivers. The geomorphological setting and flow regime should be as similar as possible post development as to prior the development, if the development is approved. Loss of any wetland animal or plant species of particular conservation importance is not expected.

Likely absence of sensitive species

Loss of Threatened or Near Threatened wetland Plants, Mammals, Reptiles, Amphibians and Invertebrates at the proposed footprint appears to be unlikely.

Connectivity

The non-perennial rivers, with riparian zones and buffer zones, at the site are corridors of particular conservation importance. The non-perennial rivers and in-channel dams, with their riparian zones and buffer zones, are excluded from the development as far as practical. The area needed for working and moving of construction vehicles, machinery and equipment to operate should be fenced off with appropriate material beyond which no activities should be allowed.

Pollution

Rubble or waste could lead to infiltration of unwanted pollutants into the soil. Spilling of petroleum fuels and unwanted chemicals onto the soils that infiltrate these soils could lead to pollution of soils and also impact on water quality when the stream flows. Rubble or waste that could accompany the construction effort, if the development is approved, should be removed during and after construction. Measures should be taken to avoid any spills and infiltration of petroleum fuels or any chemical pollutants into the soil during construction phase.

Alien invasive plant species

A rehabilitation plan which includes the combating of alien invasive plant species at the watercourses are essential. Infestation by alien invasive species could replace indigenous vegetation or potential areas where indigenous vegetation could recover. Once established combatting these alien invasive plant species may become very expensive in the long term, especially if species such as *Prosopis* (Mesquite) and *Melia azedarach* (Syringa Berry-tree) are allowed to establish. Continued monitoring and eradication of alien invasive plant species are imperative.

RISK RATING ASSESSMENT

Potential impacts, mitigations and site-specific considerations have been taken into account to arrive at risk ratings relevant to the site which follow.

The risk matrix is based on the DWS publication: Section 21 c and (i) water use Risk Assessment Protocol and Notice 509 of 2016 (Government Gazette No. 40229: 105-133; Republic of South Africa). Risk is determined after considering all listed control and/ or mitigation measures. Borderline low/ moderate risk scores can be manually adapted downwards up to a maximum of 25 points (from a score of 80) subject to listing of additional mitigation measures considered and listed in red font. Construction is here interpreted in accordance with the definition provided in Notice 509 of 2016 (Government Gazette No. 40229, p.107) to mean “any works undertaken to initiate or establish impeding or diverting or modifying resource quality, for the first time, including vegetational removal, site preparation and ground levelling”.

Table 7: A summary of the phases, activities, aspects, impacts and mitigation measures for the proposed development at the site. This summary is part of the breakdown analyses to inform the risk matrix (based on Section 21 c and (i) water use Risk Assessment Protocol and Notice 509 of 2016 (Government Gazette No. 40229: 105-133; Republic of South Africa). The relevant mitigations are added to register the availability of practical solutions to minimize any negative impacts and because the residue following the mitigation is important in the risk assessment.

Phase	Activity	Aspect	Impact	Mitigation
Construction	Clearing of vegetation at and in close proximity of watercourse at proposed footprints for stream crossings via bridge structures.	Clearing of vegetation at proposed footprint in preparation for construction and during construction.	Loss of vegetation and riparian habitat.	Non-perennial rivers, with their riparian zones and 32 m buffer zones, are excluded from the development as far as practical. If the development is approved there will be small, restricted parts of the non-perennial rivers and their buffer zone that will be impacted. Any such developments, if approved, should be restricted to a minimum and followed up by rehabilitation.
			Exposed soil at riparian zone; then soil prone to compaction or potential erosion.	Non-perennial rivers and in-channel dam, with their riparian zones and 32 m buffer zones, are excluded from the development as far as practical. If the development is approved there will be a part of the non-perennial river and its buffer zone that will be impacted. Any such developments, if approved, should be restricted to a minimum on which rehabilitation of vegetation should follow.
	Moving vehicles and working of equipment/ machinery at and in close proximity of watercourse.	Moving vehicles and working of machinery and equipment at bridge crossings and extra strip for maneuvering.	Further loss of vegetation and riparian habitat.	Non-perennial rivers and in-channel dams, with their riparian zones and 32 m buffer zones, are excluded from the development as far as practical. If the development is approved there will be a part of the non-perennial river and its buffer zone that will be impacted. The footprint area with the area needed for moving of construction vehicles, machinery and equipment to operate should be fenced off with appropriate material beyond which no activities should be allowed.
			Further exposure and compaction of soils.	Non-perennial rivers and in-channel dams, with their riparian zones and 32 m buffer zones, are excluded from the development as far as practical. If the development is approved there will be a part of the non-perennial river and its buffer zone that will be impacted. The footprint area with the area needed for moving of construction vehicles, machinery and equipment to operate should be fenced off with appropriate material beyond which no activities should be allowed.
		Vehicles and machinery could leak which then result in spilling of hydrocarbons.	Pollution of soils by hydrocarbon and unwanted chemical spills.	Equipment to avoid any spills of fuels/ oils/ hydrocarbons should be available and at once implemented where necessary at the site. Regular inspections of machinery and equipment are essential to observe any leaks and should be serviced outside the proposed footprint.
	Generation of waste or building rubble materials at proposed footprint at watercourse.	Waste or building rubble are generated during the construction phase.	Potential contamination of the watercourse habitat by generated waste or building rubble.	Manage waste and take waste away to appropriate waste-disposal sites outside the watercourse.
	Clearing of vegetation at and in close proximity	Creating access road(s) to construction area.	Loss of vegetation and habitat at and along access roads.	Existing access roads are used. Any alternative access roads, if approved, should be restricted to a minimum.

	of access roads to construction site.			
			Exposure and compaction of soils.	Existing access roads are used. Any alternative access roads, if approved, should be restricted to a minimum.
Operational	Establishment of alien invasive plant species at hitherto cleared areas.	Cleared areas where alien invasive plant species establish.	Alien invasive plant species infest hitherto cleared areas and occupy habitat which is then unavailable for indigenous species.	Continued monitoring and eradication of alien invasive plant species are imperative. A rehabilitation plan would be necessary which include the combating of alien invasive plant species.
	Poor recovery of soils that were exposed and compacted during the construction phase.	Compacted and exposed soils do not recover easily without rehabilitation.	Compacted and exposed soils are prone to further degradation and erosion.	Rehabilitation should take place which could include shallow ripping in appropriate direction and spacing. Mulch of indigenous widespread plant species or brushpacks of indigenous widespread species could also be included. Considerations such as too much ripping which could enhance erosion during high rainfall events should also be taken into account in the rehabilitation plan.

Table 8: Negative ratings of aspects for severity (flow regime, water quality, habitat, biota), spatial scale, duration and consequence. This table is part of a risk matrix (based on Section 21 c and (i) water use Risk Assessment Protocol and Notice 509 of 2016 (Government Gazette No. 40229: 105-133; Republic of South Africa).

		Severity							
Phase	**Aspect**	**Flow Regime**	**Water Quality**	**Habitat** Geomorph & Vegetation	**Biota**	**Severity**	**Spatial Scale**	**Duration**	**Consequence**
Construction	Clearing of vegetation at proposed footprint in preparation for construction and during construction.	1	1	2	2	**1,5**	1	2	**4,5**
	Moving vehicles and working of machinery and equipment at bridge crossings and extra strip for maneuvering.	1	1	2	2	**1,5**	1	2	**4,5**
	Vehicles and machinery could leak which then result in spilling of hydrocarbons.	1	2	1	2	**1,5**	1	2	**4,5**
	Waste or building rubble are generated during the construction phase.	2	2	2	2	**2**	1	2	**5**
	Creating access road(s) to construction area.	1	1	1	1	**1**	1	1	**3**
Operational	Cleared areas where alien invasive plant species establish.	1	1	2	2	**1,5**	1	2	**4,5**
	Compacted and exposed soils do not recover easily without rehabilitation.	1	2	2	1	**1,5**	1	2	**4,5**

Table 9: Negative ratings of aspects for frequency of activity, frequency of impact, legal issues, detection, likelihood, significance and finally the Risk Rating. This table is part of a risk matrix (based on Section 21 c and (i) water use Risk Assessment Protocol and Notice 509 of 2016 (Government Gazette No. 40229: 105-133; Republic of South Africa).

Phase	**Aspect**	**Frequency of activity**	**Frequency of impact**	**Legal Issues**	**Detection**	**Likelihood**	**Significance**	**Risk Rating**
Construction	Clearing of vegetation at proposed footprint in preparation for construction and during construction.	1	2	5	1	9	**40,5**	**Low**
	Moving vehicles and working of machinery and equipment	4	2	5	1	12	**54**	**Low**

	at bridge crossings and extra strip for maneuvering.							
	Vehicles and machinery could leak which then result in spilling of hydrocarbons.	2	1	5	2	12	**54**	**Low**
	Waste or building rubble are generated during the construction phase.	3	2	5	1	11	**55**	**Low**
	Creating access road(s) to construction area.	1	1	5	1	8	**24**	**Low**
Construction	Cleared areas where alien invasive plant species establish.	2	2	5	2	11	**49,5**	**Low**
	Compacted and exposed soils do not recover easily without rehabilitation.	2	2	5	2	11	**49,5**	**Low**

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of the activity + Frequency of the impact + Legal issues + Detection
Risk = Consequence X Likelihood

Table 10: Summary of Negative Risk Ratings overall for all the aspects as well as the PES and EIS of the watercourses at the site.

Risk Rating	Confidence Level	PES of watercourse	EIS of watercourse
24-55 Low	80-90%	Category E Category E	Category C Category D

6.2.2.4 Conclusion

- Tributaries of the Stinkwater river run through the site. The active channels and riparian zones as well as the catchment area have been significantly impacted by very large-scale removal of vegetation and soils.
- No wetlands appear to be present at the proposed site for the development.
- Non-perennial rivers, with their active channels and riparian zones, are present at the site. Artificial waterbodies, mostly in-channel dams, with groundwalls, are also present at the site. Water gathers at numerous excavations at the site.
- Non-perennial rivers (tributaries of the Stinkwater river system) with small in-channel dams (Dam 2, Dam 3, Dam 4 and Dam 5) are present at the site. These non-perennial rivers consist of active channels and riparian zones that have been transformed or modified at many areas along the watercourses.
- The riparian zones at the tributaries at the site are modified and transformed to a very large scale. Extensive removal of vegetation and soils and numerous excavations are present. At some parts the active channel and riparian zone of the tributaries are difficult to follow, and the connectivity broken up. Patches of vegetation along the riparian zones contain the indigenous reed *Phragmites mauritianus.* Other wetland plants such as *Cyperus* species, *Schoenoplectus* species *(Cyperaceae), Persicaria* species (Knot-weeds) and *Juncus* species (Juncaceae).
- Present ecological status (PES) of the non-perennial rivers at the site is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive. Ecological Importance and Sensitivity (EIS) of the non-perennial rivers at the is Category C which is Moderate and refers to watercourses that are considered ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.
- An artificial waterbody, an in-channel dam, Dam 1, is present at the southern side of the northern boundary of the site. This dam is the largest of the dams at the site and could possibly still be an

important area for waterbirds though the disturbances at and near the dam increased extensively over the past decade. Its functioning as a recreational area that harbours a high diversity of waterbirds and one which could be visited by bird enthusiasts and tourists are at present, in doubt.

- Extensive removal of vegetation and soils is present near Dam 1. Patches wetland plants such as *Cyperus* species, *Schoenoplectus* species *(Cyperaceae), Persicaria* species (Knot-weeds) and *Juncus* species *(Juncaceae).* Some indigenous trees also remained at the riparian zone.
- Present ecological status (PES) of Dam 1 at the site is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive. Ecological Importance and Sensitivity (EIS) of Dam 1 at the site is Category C which is Moderate and refers to watercourses that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.
- Dam 6, which could possibly be a quarry, is found at the eastern parts of the site. This dam is inherently transformed and modified. Riparian vegetation along the fringe of the dam is poorly developed. Many bare areas exist around the dam. Patches of a wetland plant species *Persicaria* species (Knot-weeds) are found at some places. Informal dumping has been occurring increasingly in recent years at Dam 6.
- Present ecological status (PES) of Dam 6 is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive. Ecological Importance and Sensitivity (EIS) of the non-perennial rivers at the central- and northern parts of the site is Category D which is Low/Marginal and refers to watercourses that are not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.
- Site is part of the Crocodile (West) and Marico Water Management Area (WMA 3). The site is not part of a Freshwater Ecosystem Priority Area (FEPA) or wetland cluster (Nel et al., 2011a, 2011b).
- No Threatened or Near Threatened wetland plant or animal species appear to be resident at the site.
- Riparian zones at the site have been modified or transformed at a number of areas at the site by extensive excavations and removal of soil. In some areas reconstruction and rehabilitation will be needed.
- Though the riparian zones and active channels (of non-perennial rivers) are modified and transformed in many areas they remain important conservation corridors. A rehabilitation plan and actions are strongly recommended.
- Reconstruction of active channels and riparian zones are imperative in many areas. Where the active channel routes have been destroyed these should be reconstructed to link the riparian systems at the site.
- The non-perennial rivers at the site, with in-channel dams, their riparian zones and buffer zones, are likely to be impacted by the proposed developments, but to a very limited extent by road- and bridge crossings. If the development is approved the construction should be planned in such a manner that surface flow function well while erosion is limited. There is no distinct indication that interflow plays an important role in the maintenance of the non-perennial rivers. The geomorphological setting and flow regime should be as similar as possible post development as to prior the development, if the development is approved. Loss of any wetland animal or plant species of particular conservation importance is not expected.
- The Negative Risk Rating in accordance with a risk matrix based on Section 21 c and (i) water use Risk Assessment Protocol and Notice 509 of 2016 (Government Gazette No. 40229: 105-133; Republic of South Africa) at the site is Low.
- If the development is approved a 32 m buffer zone is practical for the riparian zones at the site.
- If the development is approved a key aim should be to cultivate indigenous vegetation at the site and in particular at riparian conservation corridors.

6.3 SOCIAL ENVIRONMENT

6.3.1 Exiting Zoning

The farm portion is currently zoned "Undetermined" in terms of the TSHWANE Town Planning Scheme 2008 (Revised 2014).

6.3.2 Existing and Surrounding Land Use

The site is currently vacant land except with for a portion of around 80 ha on the north-western corner that has been subject to land invasion of approximately 2000 (structures). The number of structures cannot be verified with the submission of this report. Various uncontrolled and illegal sand mining has occurred on the land and the enforcement to stop is being implemented at present but seems to be very hard to manage and control.

The surrounding land uses are mostly to the west – established townships of Soshanguve extensions with a residential nature. To the east are small holdings with a residential character. Directly north of the site proposed townships of Nuwe Eersterus X 11 to 14 of Tshwane and land invasion of approximately 200 ha in extent has occurred since 2017. *Refer to Figure 18.*

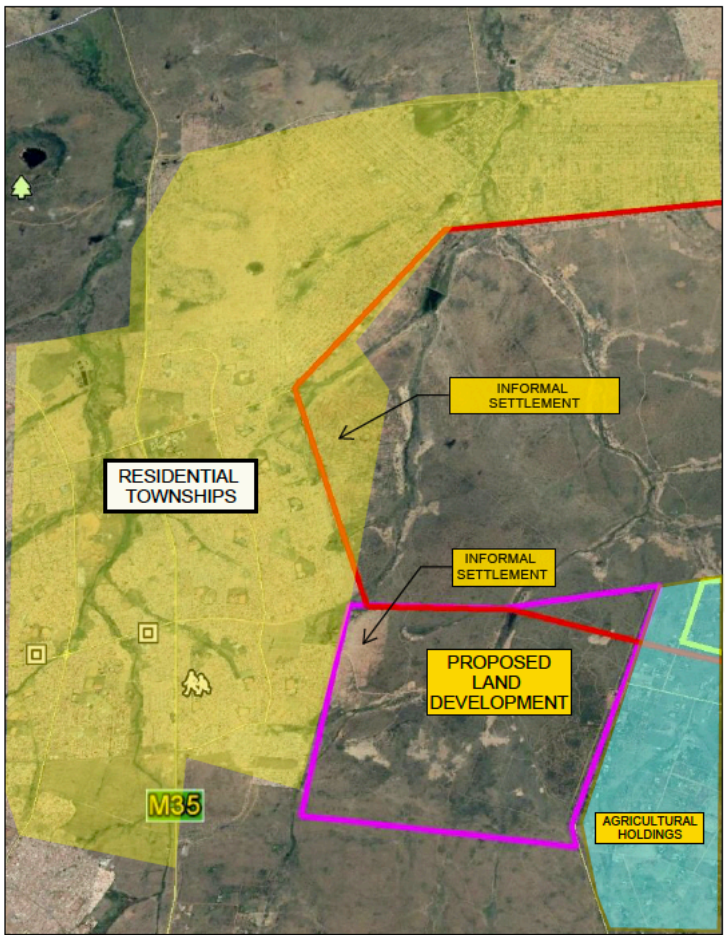


Figure 18: Existing Land Uses in the area

6.3.3 Future planning and land uses according to RSDF of Region 2

The area to the north of the site is earmarked for Urban Development and strategically located between the R80 (future PWV 9) and Bultfontein Road, which links up with the N4 Platinum Road. The land is bordered on 2 sides (north and west) by the Tshwane Urban Edge. For some unknown reason the existing Urban Edge only includes about 86 ha of the land (in the north-eastern corner) and the remainder is

located in a management Zone. Huge tracks of land to the northeast of the site have been included into the Urban Edge (almost 3000 ha) despite of the fact that large commercial agriculture activities exist on this included land.

The township establishment application with the proposed township area on the land seeks to re-address this situation as to include and approve a township of mega scale on land which is not high potential agricultural land and is more strategically located than the forementioned areas.

The City of Tshwane Human Settlements Department has already consented and is supporting the proposed township and the departure of the policy. *Refer to Appendix E.*

6.3.4 Heritage and Cultural Value

The following information has been extracted from the Heritage Impact Assessment Report (Amended Version dated February 2023) undertaken by APelser Archaeological Consulting. Refer to Appendix C7.

6.3.4.1 Introduction

A Pelser Archaeological Consulting (APAC) was originally appointed by Enviro Vision Consulting cc in 2019 to undertake a Phase 1 HIA for proposed township development on the remainder of the farm Bultfontein 107JR. The study area is located close to Soshanguve in the Greater Tshwane Municipal area of Gauteng. Texture Environmental Consultants were subsequently appointed to continue with the EIA Application for the above-mentioned development after the death of Mr. Cappie Linde of Enviro Vision.

Before his passing, Mr. Linde recommended an Augmented Heritage Impact Assessment report for the entire area according to SAHRA's Minimum Standards for Heritage Specialist Studies, including the specialist's survey tracks. The report also had to explore the possible existence of several Bafokeng kraals (dating back 1000 years plus) that may be located on the southern portion of the property.

This amended report is the result of the above recommendation. Background research indicated that there were a number of cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area falls. There were no known sites in the study area. Due to access problems, only a Desktop Based study could be completed initially during February 2019, but these issues were resolved and a Field Assessment was conducted during May 2019 in the study area. A number of archaeological sites were identified and recorded during this field work. These did not include the reported Bafokeng stone-walled sites (kraals) mentioned by the Bultfontein Land Use Committee. These sites will be discussed in this amended report.

6.3.4.2 Description of the area

The study area (proposed township development on the remainder of Bultfontein 107JR) is located close to Soshanguve, in the Greater Tshwane Municipal area of Gauteng.

The topography of the area is generally flat and open, with little or no rocky outcrops or ridges present. A relatively large spruit cuts through the north-western part of the study area, with some smaller ones running in the area as well. The area would have been utilized in the past for agricultural purposes (ploughing, cattle grazing), with a number of cement and ground dams evidence of this. Other impacts on the area included recent large scale sand quarrying activities ESKOM Power Lines and recent formal and informal residential settlement. If any cultural heritage (archaeological and/or historical sites, features or material of origin or any significance did exist here in the past it would have been extensively disturbed or destroyed as a result.

Dense vegetation (tree and grass cover) in sections of the study area during the May 2019 field assessment hampered visibility on the ground. However, sections of the area were open due to sand

quarrying and in these areas' visibility was good. It is also in these areas where some archaeological sites and material were identified. Details on these finds are provided further on in the report.

6.3.4.3 Discussion

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa the Stone Age can be divided in basically into three periods. It is however important to note that dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago
Middle Stone Age (MSA) less than 300 000 – 20 000 years ago
Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125).

Stone Age sites (ESA to LSA) are known in the larger geographical area (some in the so-called Magaliesberg Research Area), which includes rock art sites (Bergh 1999: 4). There are no known Stone Age sites in the specific study area. A relatively large spruit cuts through the north-western part of the study area, with some smaller ones running in the area as well. It is here (and in the area where sand quarrying is occurring) that a number of sites and material dating the Stone Age were identified and recorded during the assessment.

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts. In South Africa it can be divided in two separate phases (Bergh 1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

There are no known Iron Age sites close to and in the study area, although there are quite a large number of LIA stone walled sites in the larger geographical area (Bergh 1999: 7). The closest known EIA site is located at Broederstroom (p.6). No Iron Age sites, features or objects were identified during the May 2019 survey in the study area. The research of Prof. Tom Huffman indicates that the following Iron Age traditions might have been present in the larger geographical area in which the study area is located. This includes the Mzonjani facies (related to the Broederstroom site) of the Urewe Tradition dating to between AD450 and AD750 (Huffman 2007: 127); the Uitkomst facies of the same tradition dating to between AD1650 & AD1820 (p. 171); the Olifantspoort facies of the same, dating to between AD1500 & AD1700 (p.191) and finally the Buispoort facies of the Urewe Tradition dating to between AD1700 & AD1840 (p.203).

No Iron Age sites, features or material were identified in the study area during the May 2019 field assessment.

It needs to be mentioned here that the existence of possible Bafokeng stone-walled sites in the southern portion of the study & development area was brought to the attention of the Heritage Specialist recently (information provided by the Bultfontein Land Use Committee to Mr. Cappie Linde). These sites were not seen by the author of this report during the May 2019 fieldwork however. Using aerial images (Google Earth) some circles (presumably representing the stone-walled enclosures associated with these sites) can be seen in the area, with some also located outside of the study area boundaries.

The historical period started with the moving into the area by the first Europeans. The first groups to move through the larger area were those of Schoon & McLuckie and Moffat & Archbell in 1829, followed by Andrew Smith in 1835 and then David Livingstone in 1847 (Bergh 1999: 12-13), closely followed by the Voortrekkers and first white farmers.

Soshanguve is a township situated about 45 km north of Pretoria, Gauteng, South Africa. It was established in 1974 on land scheduled to be incorporated into a Bantustan bordering on Mabopane in Bophuthatswana, to Sotho, Shangaan, Nguni and Venda people (thus the name) who were resettled from Wallmansthal after being forcibly removed from their land. Schools in Soshanguve, i.e., Wallmansthal High and Khutso Primary, are originally from Wallmansthal. The first section that was built in Soshanguve is Block "K", housing residents of Wallmansthal. It later became part of the City of Tshwane Metropolitan Municipality (www.wikipedia.org).

The oldest map for the farm (of Portion 1) that could be obtained from the database of the Chief Surveyor General dates to 1914 (www.csg.dla.gov.za – CSG Document 10FQGK01). This map indicates that the farm was originally given by Deed of Grant to one P.N.C van der Merwe on the 25th of July 1870. In 1914 the farm was located in the District of Pretoria and Ward of Aapjesriver and was numbered as No.212. Portion 1 was surveyed in November 1913. Although no historical sites or features could be identified from this map it shows a number of individual stands or erven that were measured out.

6.3.4.4 Results of the Study Area Assessment

Dense grass cover and vegetation during the May 2019 assessment made visibility on the ground difficult. The assessment focused therefore on more open and exposed areas (as a result of the extensive sand quarrying) where visibility and access were easier, especially around the river and stream beds crossing through the area. Sites identified during the earlier February desktop work (on aerial images) such as the recent residential remains and soil/cement dams were not assessed, as they are deemed of no significance from a cultural heritage point of view and not older than 60 years of age. The large and recent residential developments to the north-west of the area (informal settlement areas) were also not visited during the fieldwork.

A number of Stone Age sites and occurrences (scatters of Middle Stone Age tools) were identified in the area during the field work. These are located in the area where large-scale sand quarrying is currently undertaken and although two of these sites are deemed to be more in-situ the impact of the sand quarrying is deemed to have disturbed and destroyed a large number of sites and occurrences. The sites are also located fairly close to the river/stream beds in the area and it is unlikely that the planned township development will be located here.

However, the sites are fairly significant from an archaeological point of view as not many of these open-air sites are known to exist in the larger area and therefore some mitigation measures will have to be implemented to record the Stone Age archaeology of the area before it is ultimately destroyed through both the quarrying of sand and activities related to the township development. The following mitigation measures are recommended:

1. Mapping of the Stone Age sites and scatters of Stone Age material

2. Surface sampling of representative Stone Age material (stone tools) for curation in a Museum
3. A detailed report on the findings of the mapping and sampling to be submitted to SAHRA after obtaining an archaeological research permit

GPS Location of Sites: Site 1 – S25 29 17.50 E28 09 42.90; Site 2 – S25 29 08.60 E28 09 42.50
Cultural Significance: Medium - High
Heritage Significance: Grade III: Other heritage resources of local importance and therefore worthy of conservation.
Field Ratings: General protection A (IV A): Sites should be mitigated before destruction (High/Medium significance)
Mitigation: See Above.

As mentioned earlier, the possible existence of Bafokeng stone-walled sites in the southern section of the study & proposed development area were brought to the attention of Mr. Cappie Linde by the Bultfontein Land Use Committee before he passed away. These sites were not noticed by the Heritage Specialist during the initial surveys. However, some circles that presumably represent these sites can be seen on aerial images (Google Earth) of the area, with some also visible outside of the area. Whether these features are indeed stone-walled remnants of Bafokeng settlement sites cannot be determined without a doubt at this stage, but based on the aerial imagery it seems highly likely. These sites will have to be mitigated during Phase 2 Archaeological work should the proposed development impact on them.

The following mitigation measures are recommended:

1. Mapping of the Stone-walled sites that fall inside the development area
2. Limited archaeological excavation at these sites in order to recover cultural material to assist with interpreting and reconstructing their history and origin
3. A detailed report on the findings of the mapping and sampling to be submitted to SAHRA after obtaining an archaeological research permit

Cultural Significance: Medium - High
Heritage Significance: Grade III: Other heritage resources of local importance and therefore worthy of conservation.
Field Ratings: General protection A (IV A): Sites should be mitigated before destruction (High/Medium significance)
Mitigation: See Above.

Impact Assessment and Mitigation Measures

The significance of impacts is determined using the following criteria:

Probability: describes the likelihood of the impact actually occurring

- Improbable: the possibility of the impact occurring is very low, due to the circumstances, design or experience.
- Probable: there is a probability that the impact will occur to the extent that provision must be made therefore.
- Highly probable: it is most likely that the impact will occur at some stage of the development.
- Definite: the impact will take place regardless of any prevention plans and there can only be relied on mitigation measures or contingency plans to contain the effect.

Duration: the lifetime of the impact

- Short Term: the impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
- Medium Term: the impact will last up to the end of the phases, where after it will be negated.
- Long Term: the impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
- Permanent: the impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

Scale: the physical and spatial size of the impact

- Local: the impacted area extends only as far as the activity, e.g., footprint
- Site: the impact could affect the whole or measurable portion of the abovementioned property.
- Regional: the impact could affect the area including the neighboring residential areas.

Magnitude/Severity: Does the impact destroy the environment, or alter its function

- Low: the impact alters the affected environment in such a way that natural processes are not affected.
- Medium: the affected environment is altered, but functions and processes continue in a modified way.
- High: function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Significance: This 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.

- Negligible: the impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
- Low: the impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
- Moderate: the impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
- High: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The significance is calculated by combining the criteria in the following formula:

Sum (Duration, Scale, Magnitude) x Probability
S = Significance weighting; Sc = Scale; D = Duration; M = Magnitude; P = Probability

With a number of sites, features and material of cultural heritage origin and significance found in the area during the May 2019 assessment, as well as the recent location of possible stone-walled Bafokeng settlement sites here, the current site layout provided will have an impact on some sites.

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short Term	1
	Medium Term	3
	Long Term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude)	x Probability
	Neglible	≤20
	Low	>20≤40
	Moderate	>40≤60
	High	>60

Results: 5+2+6×2 = 26 i.e., >20≤40

The impact of the proposed development on the recorded and known cultural heritage sites in the area is therefore deemed as Low based on the Impact Assessment criteria used. However, there is always a possibility of sites, features and material being missed as a result of various factors such as vegetation cover hampering visibility on the ground, as well as the often-subterranean nature of cultural heritage resources (including low stone-packed or unmarked graves). These factors need to be taken into consideration and it is therefore recommended that a Chance Finds Protocol be drafted and implemented for the proposed New Eersterus X15 development.

It is always important to note that although all efforts are made to cover a total area during any assessment and therefore to identify all possible sites or features of cultural (archaeological and/or historical) heritage origin and significance, that there is always the possibility of something being missed. This will include low stone-packed or unmarked graves. This aspect should be kept in mind when development work commences and if any sites, features or material (including graves) are identified then an expert should be called in to investigate and recommend on the best way forward.

6.3.4.5 Conclusions and Recommendations

Mr. Linde recommended the following to be included in the EIA Report:

"An Augmented Heritage Impact Assessment report for the entire area according to SAHRA's Minimum Standards for Heritage Specialist Studies in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999), including the specialist's survey tracks. The report should also explore the existence of several Bafokeng kraals (dating back 1000 years plus) that may be located on the southern portion of the property"

Background research indicated that there were a number of cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area falls. There were no known sites in the study area.

A number of Stone Age sites and occurrences were identified in the area during the field work. These sites are fairly significant from an archaeological point of view as not many of these open-air sites are known to exist in the larger area and therefore some mitigation measures will have to be implemented to record the Stone Age archaeology of the area before it is ultimately destroyed through both the quarrying of sand and activities related to the township development. The following mitigation measures are recommended:

1. Mapping of the Stone Age sites and scatters of Stone Age material
2. Surface sampling of representative Stone Age material (stone tools) for curation in a Museum
3. A detailed report on the findings of the mapping and sampling to be submitted to SAHRA after obtaining an archaeological research permit

The possible Bafokeng stone-walled sites recently identified in the study and development area will have to be mitigated during Phase 2 Archaeological work as well, should the proposed development impact on them.

The following mitigation measures are recommended:

1. Mapping of the Stone-walled sites that fall inside the development area;
2. Limited archaeological excavation at these sites in order to recover cultural material to assist with interpreting and reconstructing their history and origin; and
3. A detailed report on the findings of the mapping and sampling to be submitted to SAHRA after obtaining an archaeological research permit

The impact of the proposed development on the recorded and known cultural heritage sites in the area is deemed as Low based on the Impact Assessment criteria used. However, there is always a possibility of sites, features and material being missed as a result of various factors such as vegetation cover hampering visibility on the ground, as well as the often-subterranean nature of cultural heritage resources (including low stone-packed or unmarked graves). These factors need to be taken into consideration and it is therefore recommended that a Chance Finds Protocol be drafted and implemented for the proposed Bultfontein Development.

To conclude, based on the 2019 desktop research and field assessment, as well as the new information included in this amended 2023 Report, from a Cultural Heritage point of view the proposed township development should be allowed to continue, taking into consideration the mitigation measures recommended above.

The often-subterranean nature of archaeological and historical remains (including low stone-packed or unmarked graves) should always be taken into consideration as well. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

7 PROJECT ALTERNATIVES

In terms of the EIA Regulations, Section.28 (1) (c) feasible alternatives are required to be considered as part of the environmental investigations. In addition, the obligation that alternatives are investigated is also a requirement of Section 24(4) of the National Environmental Management Act (Act No. 107 of 1998) (as amended). An alternative in relation to a proposed activity refers to the different means of meeting the general purpose and requirements of the activity (as defined in GNR 982 of the EIA Regulations, 2014), which may include alternatives to:

- the property on which or location where it is proposed to undertake the activity;
- 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.

Based on the above the following alternatives were investigated for the proposed New Eersterus X 15 development.

a) Site alternatives

Site Alternatives	Description
Alternative Site 1 (only alternative)	A portion of the Remainder of the farm Bultfontein 107 JR.
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 mixed-use development consisting of Residential 1, Residential 3, Residential 4, Business 2, Institutional, including Hospital, Educational, Industrial, Municipal and Public Open Space land uses.
Alternative 2	The need and desirability of a mixed-use development consisting of Residential 1, Residential 3, Residential 4, Business 2, Institutional, including Hospital, Educational, Industrial, Municipal and Public Open Space land uses been confirmed. No activity alternatives were considered due to the benefits associated with a mixed-use development.

c) Layout alternatives

Activity Alternatives	Description
Alternative 1	Layout Alternative 1 encroached the high ecological sensitive areas i.e. rocky slopes and their buffer zones at the southwestern parts of the site as well as the area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found at the site. *Refer to Figures 24 and 25.*
Alternative 2 (Preferred Alternative)	Layout Alternative 2 excluded the high ecological sensitive areas i.e. rocky slopes and their bufferzones at the southwestern parts of the site as well as the area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found at the site. *Refer to Figure 26.*

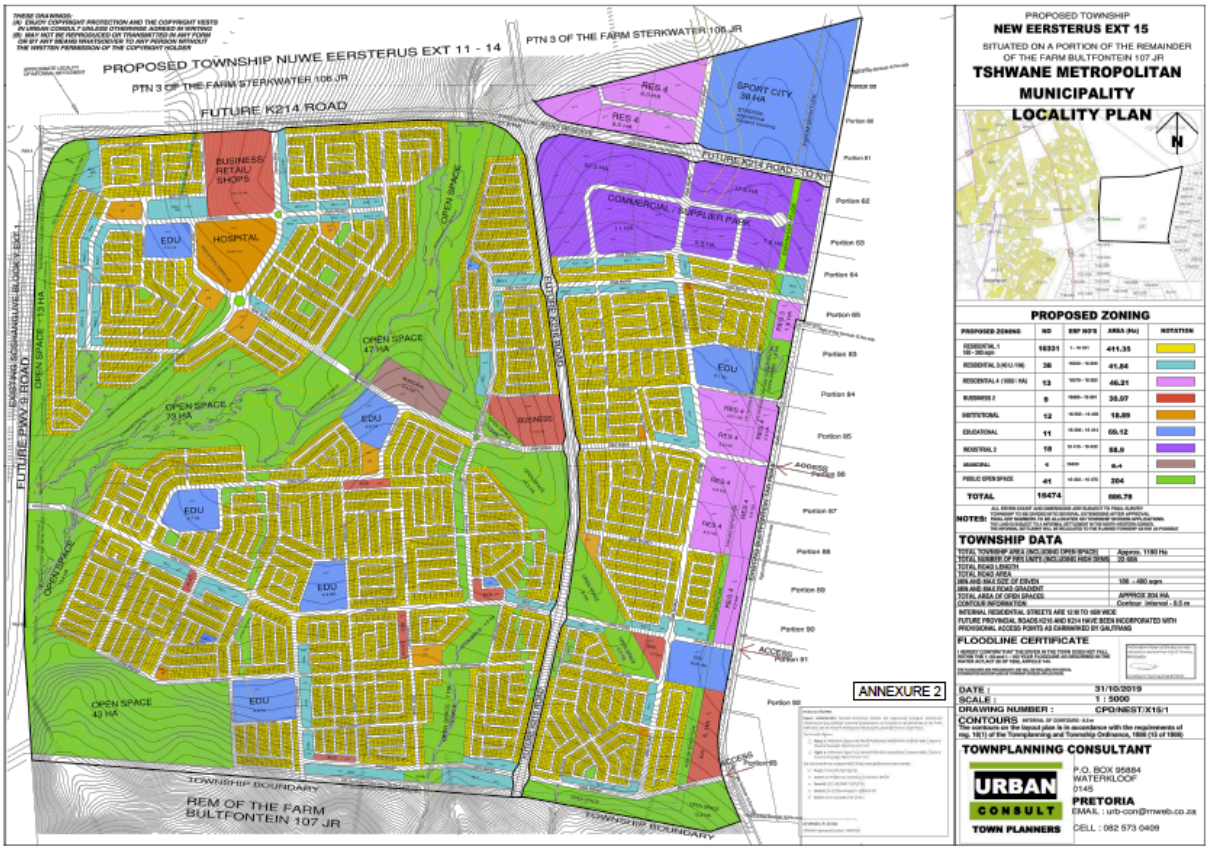


Figure 19: Layout Plan – Layout Alternative 1

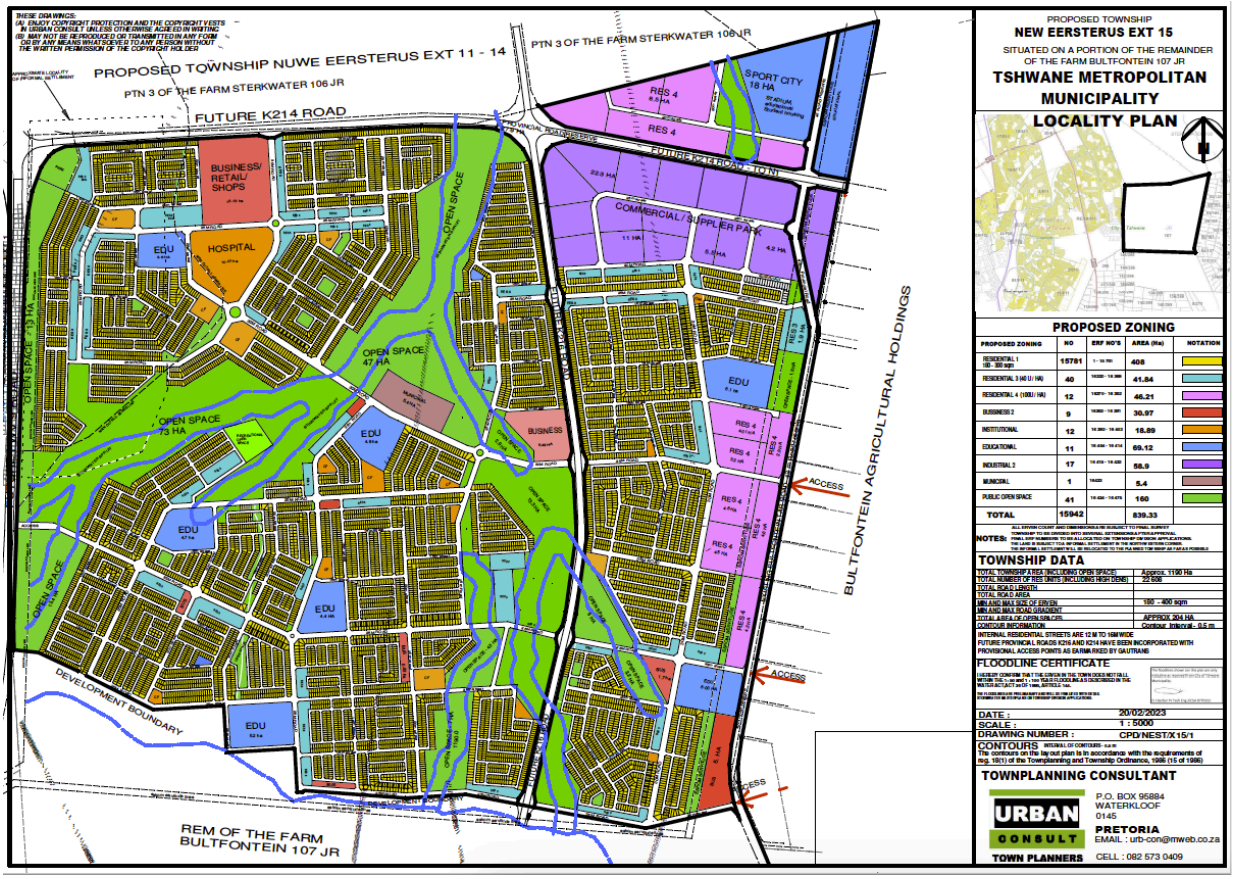


Figure 20: Layout Plan - Layout Alternative 2 (Preferred Alternative)

d) No-Go alternative

Should this option be implemented, the "status quo" will prevail and none of the advantages associated with the proposed mixed-use development will realize.

Motivation for the preferred alternatives

Layout Alternative 2 (Proposal)

The original draft Layout (Alternative 1) encroached the high ecological sensitive areas i.e. rocky slopes and their buffer zones at the southwestern parts of the site as well as the area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found at the site. The draft Layout was amended to exclude the high ecological sensitive areas in the development. As a result, the number of Residential 1 erven were reduced from 16 331 to 15 781, Res 3 erven were increased from 38 to 40 and Res 4 erven were reduced from 13 to 12 in the proposed Layout (Alternative 2) (Figure 20). Layout Alternative 2 is regarded as the preferred alternative due to the conservation of high ecological sensitive areas.

No-Go Alternative

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

None of the advantages associated with the proposed mixed-use development consisting of much needed affordable housing, business, educational, industrial and institutional uses, as well as upgrading of services and infrastructure, will realize should the no-go option be implemented.

In addition, the No-Go alternative will result in further degradation and transformation of the site due to illegal excavations and further invasion by informal settlements, clearly indicated in a comparison of Google Earth Pro images of the past (2004) and at present (2023).

The no-go option is therefore not regarded as a viable alternative.

8 PUBLIC PARTICIPATION PROCESS

Chapter 6 of Government Notice No. R. 326 of 7 April 2017 provides for a public participation process.

It is further stipulated that the person conducting a public participation process must take into account any guidelines applicable to public participation and must give notice to all potential interested and affected parties of the application which is subjected to public participation by:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is or is to be undertaken; and any alternative site mentioned in the application;
- Giving written notice to:
    - The occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    - The owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    - The municipal councilor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represents the community in the area;
    - The municipality which has jurisdiction in the area; and
    - Any organ of state having jurisdiction in respect of any aspect of the activity; and
    - Any other party as required by the competent authority.
- Placing an advertisement in one local newspaper; or any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations; and
- Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette;
- Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to illiteracy, disability or any other disadvantage.

The main purpose of the public participation process that was undertaken in this regard, over and above giving effect to the relevant regulations, was to obtain information through a process of informing and involving interested and affected parties (I&AP's). The aim was for potential I&AP's to become aware of the positive and negative effects that the development may bring about in their living environments. The identification and consideration of negative effects can also serve as basis for the developer to effect changes in the course of action, either through mitigation of undesirable or unaccepted impacts, or through the introduction of alternatives.

The following objectives were pursued through the public participation process:

- To inform potential I&APs of the development;
- To allow potential I&APs to raise issues, concerns and suggestions;
- To promote transparency and an understanding of the project;
- To direct the focus of the EIA towards the most pertinent issues ;

• It was not one of the objectives of the public participation process to quell opposition or to foster consensus among role players.

This section of the report focuses on the issues and comments raised by I&APs, if any. These inputs will be used to determine the anticipated impacts that such a development can have on the environment and highlight particular issues related to the project. The perceived impacts can assist individuals, communities as well as government to understand and anticipate the possible consequences (positive and negative) of the project.

8.1 Public Participation Activities Undertaken during the Scoping Phase

Notification of potential I&AP's

In terms of Subsection (6) of Section 41 of Government Notice No. R. 326 of 7 April 2017 the person conducting the public participation process must ensure that information containing all relevant facts in respect of the application is made available to potential or registered interested and affected parties; and that participation by potential interested and affected parties is facilitated in such a manner that all potential interested and affected parties are provided with a reasonable opportunity to comment on the application.

Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process may be combined with any public participation process prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.

In order to comply with this requirement as well as other related requirements stated in the relevant regulations, written notice of the development together with the opportunity to comment was given to the following persons and / or institutions:

Written notice was given to owners and occupants of the following adjacent properties *(refer to Appendix G(i)):*

PROPERTY DESCRIPTION
The Remainder of Portion 1 Sterkwater 106 JR
Portion 30 Bultfontein 107 JR
Portion 59 Bultfontein 107 JR
Portion 60 Bultfontein 107 JR
Portion 61 Bultfontein 107 JR
Portion 62 Bultfontein 107 JR
Portion 63 Bultfontein 107 JR
Portion 64 Bultfontein 107 JR
Portion 65 Bultfontein 107 JR
Portion 83 Bultfontein 107 JR
Portion 84 Bultfontein 107 JR
Portion 85 Bultfontein 107 JR
Portion 86 Bultfontein 107 JR
Portion 87 Bultfontein 107 JR
Portion 88 Bultfontein 107 JR
Portion 89 Bultfontein 107 JR
Portion 90 Bultfontein 107 JR
Portion 91 Bultfontein 107 JR
Portion 92 Bultfontein 107 JR
Portion 93 Bultfontein 107 JR

Written notice was given to the City of Tshwane Metropolitan Municipality (Appendix G(ii)).

A letter of notification was sent by E-mail to Councilor JJ Coetzee, the municipal councilor of Ward 96, the ward in which the site is situated (Appendix G(iii)).

A letter of notification was delivered to the Office of the Regional Director: Gauteng, Department of Water Affairs (Appendix G(iv)).

Fifty notices were given to the Mr James Mohlaule, Chairperson of the Dali Mphofu View informal settlement for purposes of distribution to community members (Appendix G(v)). No response was received to date. A meeting was held with the Chairperson of Dali Mphofu View on 18 February 2020 (refer to Appendix G(xii) for Attendance Register).

Proof of notice board

In terms of Subsection (4) of Section 41 of Government Notice No. R. 326 of 7 April 2017 the required notice board must:

- Give details of the application which is subjected to public participation; and
- State that the application has been submitted to the competent authority in terms of these Regulations, as the case may be; whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation; the nature and location of the activity to which the application relates; where further information on the application or activity can be obtained; and the manner in which and the person to whom representations in respect of the application may be made;
- Be of a size at least 60cm by 42cm; and
- Display the required information in lettering and in a format as may be determined by the competent authority.

A notice board complying with the stated requirements was placed on the subject property on 29 May 2019 (Appendix G(vi)).

Proof of newspaper advertisement

In terms of Subsection (2) of Section 41 of Government Notice No. R. 326 of 7 April 2017 an advertisement must be placed in one local newspaper; or any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations; the required advertisement must:

- Give details of the application; and
- State that the application has been or is to be submitted to the competent authority in terms of these Regulations, as the case may be; whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation; the nature and location of the activity to which the application relates; where further information on the application or activity can be obtained; and the manner in which and the person to whom representations may be made.

An advertisement complying with the requirements was placed in the Gauteng Provincial Government Gazette of 5 June 2019 (Appendix G(vii)).

Written responses were received from the following individuals and organisations:

SURNAME	NAME	CAPACITY	EMAIL ADDRESS	PHONE
Booysen	Ilsa	Interested Party	ilsa@cityplan.co.za	
Cornell	Eleanor	Adjacent landowner, Plot 64 Huilboom Ave	e.cornell@mymtn.co.za	
De Kock	Reino	Adjacent landowner, Plot 60 Huilboom Ave	dekockrh@saps.gov.za	0823225251
Dreyer	Conna	Owner Plot 157 Honingnestkrans	dreyer.conna@gmail.com	
Du Toit	Lisa	Owner Portion 84 Bultfontein	lisa.dutoit@dst.gov	0128436354
Fransolet	GJ	Nearby property owner	admin@franre.co.za	0824426667
Goosen	Pieter	Resident	goosenart@gmail.com	0823796767
Grasitti	Marcos	Resident & Community Policing Forum	marcos@alphachicks.co.za	0718703286
Griesel	Jacques	Property owner, farmer	jacquesgriessel40@gmail.com	0823540740
Grobbelaar	Jaco	Representative Agriforum	jaco.grobbelaar@afriforum.co.za	
Grunewald	Tosca	Adjacent landowner	tosca247@gmail.com	0724788856
Gunter	Daleen	6 Kiewiet Street Onderstepoort	gunter.daleen@gmail.com	071471212
Hamman	Emile	Resident	emile.hamman@clarke-energy.com	07162242958
J V Rensburg	Marnus & yolandi	Plot 125 Bergsering Ave	leeutji@gmail.com	
Masethla	Mathews	Plot 142 Koraalboom Street	masehlamathews@gmail.com	0723383055
Matthee	Olivier	Plot 174 Bultfontein	olivier.matthee1@gmail.com	
Ngotho	Stephen	Plot 150 Maroela Street, Bultfontein	spngotho@yahoo.com	
Oosthuizen	Jacques	Resident	jacques.oosthuizen@gmail.com	0832797907
Pieterse	Stephanus & Cecelia	Plot 193 Sekelbos Avenue	ceceliapieterse@yahoo.com	
Schutte	Chris	Chairperson: Apiesrivier Boerevereniging	info@entechcon.co.za	
Sewell	David & Natalie	Plot 90 Bultfontein	nataliesewell11@gmail.com	
Smit	Jaco & Willem	170 Knoppiesdoringboom Ave Bultfontein	jsmit@besttech.co.za	0829404319
Stander	Giepie & Jana	Plot 89, Bultfontein		
Van Biljon	Marius	Plot 13 Rooiwal	alive@telkomsa.net	
Van Der Waal	Gert	Direct neighbour	gert.vdwaal@gmail.com	
Van Tonder	Wesel & Thea	Owners 110 Akasia Street, “Ons Bult”	info@wthprojekte.co.za	0834697996
Vosloo	Johannes & Elsie	Plot 106 Bultfontein Road	jevboerdery@gmail.com	

Kindly refer to the relevant comments and responses (Appendix G (viii)).

I&AP Register

In terms of Section 42 of Government Notice No. R. 326 of 7 April 2017 an applicant must ensure the opening and maintenance of a register which contains the names and addresses of all persons who, as a consequence of the public participation process, have submitted written comments or attended meetings with the applicant or EAP; all persons who, after completion of the public participation process have requested the applicant, in writing, for their names to be placed on the register; and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Based on the above the following I&AP register was opened (Appendix G(xiii))

I&AP	Capacity	Address
Nhlanhla Makhatini DD: SAS GDARD	Competent Authority	56 Eloff Street, Umnotho House JOHANNESBURG 2000
The Manager: Crocodile (West) & Marico WMA Department of Water and Sanitation	Government Department	285 Francis Baard Street PRETORIA 0001
The Executive Director: Environmental Management Division City of Tshwane Metropolitan Municipality	Local Authority	Tshwane House 320 Madiba Street PRETORIA 0001
Cnclr JJ Coetzee Ward 96 City of Tshwane Metropolitan Municipality	Local Authority	tridoors@mweb.co.za
Agriforum (Jaco Grobbelaar)	Stakeholder	jaco.grobbelaar@afriforum.co.za
Apiesrivier Boerevereniging (Chris Schutte)	Stakeholder	info@entechon.co.za
Booysen, Ilsa	Interested party	ilsa@cityplan.co.za
Cornell, Eleanor	Adjacent landowner, Plot 64 Huilboom Ave	e.cornell@mymtn.co.za
De Kock, Reino	Adjacent landowner, Plot 60 Huilboom Ave	dekockrh@saps.gov.za
Dreyer, Conna	Owner Plot 157 Honingnestkrans	dreyer.conna@gmail.com
Du Toit, Lisa	Owner Portion 84 Bultfontein	lisa.dutoit@dst.gov
Fransolet, GJ	Nearby property owner	admin@franre.co.za
Goosen, Pieter	Resident	goosenart@gmail.com
Grasitti, Marcos	Resident & Community Policing Forum	marcos@alphachicks.co.za

Griesel, Jacques	Property owner, farmer	jacquesgriessel40@gmail.com
Grunewald, Tosca	Adjacent landowner	tosca247@gmail.com
Gunter, Daleen	6 Kiewiet Street Onderstepoort	gunter.daleen@gmail.com
Hamman, Emile	Resident	emile.hamman@clarke-energy.com
Janse V Rensburg, Marnus & Yolandi	Plot 125 Bergsering Ave	leeutji@gmail.com
Mahlaule	Dali Mphofu View	0793902770
Masethla, Mathews	Plot 142 Koraalboom Street	masehlamathews@gmail.com
Matthee, Olivier	Plot 174 Bultfontein	olivier.matthee1@gmail.com
Ngotho, Stephen	Plot 150 Maroela Street, Bultfontein	spngotho@yahoo.com
Oosthuizen, Jacques	Resident	jacques.oosthuizen@gmail.com
Pieterse, Stephanus & Cecelia	Plot 193 Sekelbos Avenue	ceceliapieterse@yahoo.com
Sewell, David & Natalie	Plot 90 Bultfontein	nataliesewell11@gmail.com
Smit, Jaco & Willem	170 Knoppiesdoringboom Ave Bultfontein	jsmit@besttech.co.za
Stander, Giepie & Jana	Plot 89, Bultfontein	Giepie01@africa.com; jana.stander@up.ac.za
Van Biljon, Marius	Plot 13 Rooiwal	alive@telkomsa.net
Van Der Waal, Gert	Direct neighbour	gert.vdwaal@gmail.com
Van Tonder, Wessel & Thea	Owners 110 Akasia Street, Ons Bult Residents Association	info@wthprojekte.co.za
Vosloo, Johannes & Elsie	Plot 106 Bultfontein Road	jevboerdery@gmail.com

Distribution of reports

In terms of Subsection 1 of Section 43 of Government Notice No. R. 326 of 7 April 2017 a registered interested and affected party is entitled to comment, in writing, on all written submissions made to the competent authority by the applicant, and to bring to the attention of the competent authority any issues which that party believes may be of significance to the consideration of the application, provided that comments submitted within the relevant timeframes or any extension, and the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

A copy of the Draft Scoping Report has been distributed to the registered Interested and Affected Parties for comment (Appendix G(ix)).

Comments on the Draft SR was received from CoT Environment & Agriculture Management Department, Environmental Planning & Open Space Management Section. Comments and responses in this regard have been included in Appendix G(x) of this report.

Refer to Appendix G(xi) for comments and responses on the Draft SR from I&APs.

Summary of issues raised

In terms of Section 44 of Government Notice No. R. 326 of 7 April 2017 the applicant must ensure that the comments of interested and affected parties are recorded in reports and that such written comments, including records of meetings, are attached to the reports that are submitted to the competent authority in terms of these Regulations.

Comments and responses have been included as Appendix G(xi).

Issues that were raised during the prescribed public participation process can be summarised as follow:

- Loss of agricultural land.
- Loss of property value of neighboring properties.
- Increased traffic and people, posing safety and security risk.
- Construction will have numerous negative impacts (crime, noise, dust, littering, pollution, vegetation loss, disturbance of animals).
- Negative impact on rare and protected animals, reptiles and birds.
- Negative impact on sites of archaeological, historical and cultural significance.
- Increased pressure on the underground water resources.
- Lack of bulk service infrastructure (electricity, water, roads and sewage).

8.2 Public Participation Activities Undertaken during the EIA Phase

Notification of the availability of the Draft EIAR for comment was submitted to all registered I&APs and organs of state which have a jurisdiction over certain aspects of the proposed development.

The Draft EIAR will be available for comment on the Texture Environmental website using a given link. The comment period will be for 30 days from 27/02.2023 until 29/03/2023. Refer to Appendix G(xiv) for proof of notification of I&APs.

Copies of the DEIAR were submitted to the following key stakeholders:

- The Executive Director: Environmental Management Division, City of Tshwane Metropolitan Municipality, (refer to Appendix G(xv) for proof of submission)
- The Manager: Crocodile (West) & Marico WMA, Department of Water and Sanitation (refer to Appendix G(xvi) for proof of submission)
- SA Heritage Resources Agency (via SAHRIS) (refer to Appendix G(xvii) for proof of submission)

Comments on the DEIAR received from above-mentioned key stakeholders and registered I & APs will be included and addressed in the Final EIAR.

9 ENVIRONMENTAL IMPACT ASSESSMENT

9.1 Introduction

The EIA of the project activities is determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental aspects.

The environmental impact assessment has included all phases of the project namely:

- Construction Phase; and
- Operational Phase.

Please note: due to the nature of the development it is anticipated that the infrastructure would be permanent, thus not requiring decommissioning or rehabilitation. Maintenance of infrastructure will be addressed under the operational phase.

9.2 Impact Assessment 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:

- Nature: A brief written statement of the environmental aspect being impacted upon by a particular action or activity.

- 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;

- Duration: Indicates what the lifetime of the impact will be;

- Intensity: Describes whether an impact is destructive or benign;

- Probability: Describes the likelihood of an impact actually occurring; and

- 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 11: 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. The only class of	**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

		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 12: CRITERIA FOR THE 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.	

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented. Mitigation measures identified as necessary will be included in an EMPr. The EMPr will form part of the Environmental Impact Assessment Report (EIAR). Refer to Appendix F.

9.3 Impacts

9.3.1 Geology Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Geotechnical constraints such as collapsible soils, seasonal seepage water, soil heave, highly compressible upper soils, erodibility of soils, excavation difficulty, steep slopes and areas subject to flooding may negatively affect the construction phase and installation of services.	1	2	2	4	Negative Medium (-8)	• Earthworks and foundation precautionary measures will be required. • Drainage precautionary measures and construction phasing and timing will be required. • Earthwork and/or foundation precautionary measures will be required for structures. • Basic surface water flow control measures will be required to prevent excessive erosion and undercutting of structures. • The use of pneumatic equipment and/or localised blasting may be required in areas across the site, especially towards the southern to south-western site portions. • Localised areas of steep slopes will require basic design or construction modifications/specifications. • The areas subject to flooding should be determined by a competent person. • Residential development should ideally be excluded from regions falling below the 1:100-year flood line, or as otherwise indicated by a competent person or relevant national standards. • The following assessments will be required to refine broadly assigned zones:	1	2	1	2	Negative Low (-6)

						- Floodline assessment with certified 1:50-year and 1:100-year floodlines. - Wetland delineation with indicated wetland boundaries and environmental sensitive areas to be excluded from the proposed development. - Site-specific ground survey for identification of potential flash-flood areas/paths to incorporate and address in the stormwater drainage designs. • The detailed preliminary shallow soil engineering geological investigation should be followed with a SANS634:2012 aligned Phase 1 detailed engineering geological assessment. The information from the flood assessment, wetland assessment and ground elevation survey should be made available to incorporate into the Phase 1 detailed assessment, together with the infill investigation, to refine the preliminary assigned zones provided in the report.					
Stability of structures	1	2	2	2	Negative Medium (-8)	• Foundation design, building procedures and precautionary measures for single-storey type 1 masonry buildings, founded on soil horizons subject to both consolidation and collapse settlement, supplied by the geotechnical engineer, shall be implemented. • Larger structures should be designed by a competent engineer. • Foundations for free-standing walls and retaining walls that comply with the requirements of SANS 10400-K shall be in accordance with the specifications	1	1	1	1	Negative Low (-6)

						provided in SANS10400-H. • Bearing capacity input should be provided for all high-bearing or sensitive structures. The design engineer should liaise with the engineering geologist for input on all high bearing structures/foundations such as high bearing pad footings, shallow high bearing strip foundations, elevated reservoirs, ground based sensitive concrete dams etc. • Areas of existing structures (Zone IV) and areas of mine workings (Zone II) are present on site. Basic rehabilitation and foundation precautionary measures will be required for structures to be erected in these areas. The same will apply in areas affected negatively by existing or historic underground infrastructure or workings of any kind. Foundation options and solutions should be provided for these regions in the Phase 1 detailed engineering geological assessment. Earthwork and foundation options may include basic rehabilitation, soil mattress and/or foundation and masonry reinforcement. • The detailed preliminary shallow soil engineering geological investigation should be followed with a SANS634:2012 aligned Phase 1 detailed engineering geological assessment.					
OPERATIONAL											
Geotechnical constraints such as collapsible soils, seasonal seepage water, soil heave, highly compressible upper soils, erodibility of soils, excavation difficulty, steep slopes and areas subject to flooding may negatively affect the	1	4	2	4	Negative High (-10)	• Residential development should ideally be excluded from regions falling below the 1:100-year flood line, or as otherwise indicated by a	1	4	2	2	Negative Medium (-8)

operational phase and installation of services in the phased development.						competent person or relevant national standards. • The recommendations and precautionary measures supplied by the geotechnical engineer should be implemented.					

9.3.2 Topographical Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Surface gradient	1	2	2	3	Negative Medium (-8)	• Surface drainage measures should be in place according to the engineer's design to ensure good site drainage without ponding of water after precipitation.	1	2	1	2	Negative Low (-6)
Alteration of topography due to stockpiling of soil, building material and debris and waste material on site.	1	3	2	3	Negative Medium (-9)	• 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.	1	2	1	2	Negative Low (-6)

9.3.3 Hydrogeology Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Groundwater contamination due to construction activities	2	4	3	3	Negative High (-12)	Construction Site • No temporary facilities, temporary accommodation, temporary storage to be setup within 50m of any watercourse. • 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. Diesel, hydraulic fluid and lubricants • 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. Construction Vehicles • All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be	2	4	1	2	Negative Medium (-9)

						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. Construction site domestic waste and sewage • Minimise on-site accommodation. • 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. Construction site inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc) • Ensure compliance with stringent daily clean up requirements on site. • Dispose at municipal waste disposal sites. Construction site hazardous waste • 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.					
OPERATIONAL											
Leaks of untreated water from pipelines may occur and impact on the groundwater quality.	1	2	2	3	Negative Medium (-8)	Any leaks should be fixed immediately, and areas rehabilitated as needed.	1	2	1	2	Negative Low (-6)

9.3.4 Hydrology Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Increased urban run-off	2	2	2	1	Negative Medium (-7)	• Land disturbance must be minimized in order to prevent erosion and run-off - this includes leaving exposed soils open for a prolonged period of time. As soon as vegetation is cleared (including alien) the area must be re-vegetated if it is not to be developed on in future.	2	1	1	1	Negative Low (-5)
Flood risk	2	2	2	1	Negative Medium (-7)	• Floodline assessment with certified 1:50-year and 1:100-year floodlines. • Site-specific ground survey for identification of potential flash-flood areas/paths to incorporate and address in the stormwater drainage designs. • No structures to be erected within the 1:100 year floodline areas	2	1	1	1	Negative Low (-5)
Impeding & impounding of watercourses	2	2	1	2	Negative Medium (-7)	• The existing inflow of the non-perennial rivers may not be altered or impounded or reduced. • A 32m wide buffer around the non-perennial rivers must be implemented and maintained. • General surface stormwater flow and movement may be altered and re-routed as part of the normal stormwater management systems and plans for the designs and construction of the township. • Mitigation measures to be implemented during construction of roads and installation of services within non-perennial rivers.	1	1	2	1	Negative Low (-5)

OPERATIONAL											
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.	1	3	2	3	Negative Medium (-9)	Stormwater Management are addressed in the Environmental Management Programme (EMPr). A site-specific stormwater management plan is required.	1	2	1	2	Negative Low (-6)

9.3.5 Vegetation and Fauna Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	**Before Mitigation**				**Significance Rating (before mitigation)**	**Mitigation and management measures**	**After Mitigation**				**Significance Rating (after mitigation)**
	E	**D**	**I**	**P**			**E**	**D**	**I**	**P**	
CONSTRUCTION											
Habitat loss, loss of indigenous species due to clearing of vegetation. Loss of riparian habitat due to clearing of vegetation at proposed footprints for stream crossings via bridge structures.	2	4	2	4	Negative High (-12)	Keep disturbance to less sensitive area. Avoid non-perennial rivers and their buffer zones. Avoid artificial waterbodies and their buffer zones. Non-perennial rivers, with their riparian zones and 32 m buffer zones and artificial water bodies with 32m buffer zones to be excluded from the development as far as practical. If the development is approved there will be small, restricted parts of the non-perennial rivers and their buffer zone that will be impacted. Any such developments, if approved, should be restricted to a minimum and followed up by rehabilitation. The footprint area with the area needed for moving of construction vehicles, machinery and equipment to operate should be fenced off with appropriate material beyond which no activities should be allowed.	1	2	1	2	Negative Low (-6)

Loss of sensitive species Presence of Threatened or Near-Threatened Plants, Mammals, Reptiles, Amphibians and Invertebrates at the site appear to be unlikely. A protected (but not threatened) tree species *Sclerocarya birrea* (Marula) is present at the site.	1	4	2	2	Negative Medium (- 9)	A permit at the relevant authorities should be applied for in case of any damage or removal of individual trees of *Sclerocarya birrea* (Marula) trees, if the development is approved.	1	1	2	1	Negative Low (- 5)
Loss of corridors of particular conservation concern	2	4	2	4	Negative High (-12)	Demarcate and avoid riparian zones and buffer zone. Demarcate and avoid artificial waterbodies and buffer zones.	1	1	2	1	Negative Low (-5)
Disturbance or killing of vertebrates	1	4	2	2	Negative Medium (-9)	If the development is approved, contractors must ensure that no animal species are disturbed, trapped, hunted or killed during the construction phase.	1	2	1	1	Negative Low (-5)
Potential erosion due to exposed soil at riparian zone	1	4	2	2	Negative Medium (-9)	Non-perennial rivers with their riparian zones and 32 m buffer zones to be excluded from the development as far as practical. If the development is approved there will be a part of the non-perennial rivers and buffer zones that will be impacted due to installation of services and construction of roads. Any such development should be restricted to a minimum on which rehabilitation of vegetation should follow.	1	2	1	1	Negative Low (-5)
OPERATIONAL											
Increased infestation of exotic or alien invasive plant species	2	4	2	4	Negative High (- 12)	Monitoring and eradication of alien invasive plant species	1	2	1	1	Negative Low (-5)
Compacted and exposed soils are prone to further degradation and erosion.	1	4	2	2	Negative Medium (-9)	Rehabilitation should take place which could include shallow ripping in appropriate direction and spacing. Mulch of indigenous widespread plant species or brushpacks of indigenous widespread species could also be included. Considerations such as too much ripping which could enhance erosion during high rainfall events	1	2	1	1	Negative Low (-5)

						should also be taken into account in the rehabilitation plan.					

9.3.6 Waste Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Contamination of the surface and site with general waste.	1	2	2	3	Negative Medium (-8)	• 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. • General waste produced on site is to be collected in skips for disposal at the local municipal waste 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	1	2	1	2	Negative Low (-6)

						site at regular intervals and disposed of in suitable waste receptacle. • Manage waste and take waste away to appropriate waste-disposal sites outside the watercourses and 1:100 year floodline areas.					
Contamination of the surface and site with hazardous waste. Hazardous waste produced on site include: • Oil and other lubricants, diesel, paints, solvent; • Containers that contained chemicals, oils or greases; and • Equipment, steel, other material (rags), soils, gravel and water contaminated by hazardous substances (oil, fuel, grease, chemicals or bitumen).	1	2	3	3	Negative Medium (-9)	• Hazardous waste is to be disposed at a Permitted Hazardous Waste Landfill Site. • The Environmental Manager must have as part of his/her records the waste manifest for each batch based disposal. • Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid). • A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. • In the case of a spill of hydrocarbons, chemicals or bituminous, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk.	1	1	2	2	Negative Low (-6)
OPERATIONAL											
Generation and disposal of domestic waste by the proposed development.	1	3	2	2	Negative Medium (-8)	Waste will be collected by an accredited waste company and disposed of at an appropriate and licensed waste disposal facility.	2	1	1	2	Negative Low (-6)

9.3.7 Air Quality Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	**Before Mitigation**				**Significance Rating (before mitigation)**	**Mitigation and management measures**	**After Mitigation**				**Significance Rating (after mitigation)**
	E	**D**	**I**	**P**			**E**	**D**	**I**	**P**	

CONSTRUCTION											
Dust and emissions during construction generated by debris handling and debris piles, truck transport, bulldozing, general construction.	1	2	2	3	Negative Medium (-8)	• 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 made necessary due to the exceedance of Air Quality Guidelines.	2	1	1	2	Negative Low (-6)

9.3.8 Noise Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
During the construction phase there is likely to	1	2	3	2	Negative Medium	• All construction activities should be	1	1	1	2	Negative Low

be an increase in noise pollution from construction vehicles and construction staff.					(-8)	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).					(-5)

9.3.9 Heritage Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
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. A number of Stone Age sites and occurrences (scatters of Middle Stone Age tools) were identified in the area during the field work.	2	4	2	4	Negative High (- 12)	• Mapping of the Stone Age sites and scatters of Stone Age material • Surface sampling of representative Stone Age material (stone tools) for curation in a Museum • A detailed report on the findings of the mapping and sampling to be submitted to SAHRA after obtaining an archaeological research permit	1	1	1	2	Negative Low (-5)

Possible existence of Bafokeng stone-walled sites	2	4	3	3	Negative High (-12)	• Mapping of the Stone-walled sites that fall inside the development area • Limited archaeological excavation at these sites in order to recover cultural material to assist with interpreting and reconstructing their history and origin • A detailed report on the findings of the mapping and sampling to be submitted to SAHRA after obtaining an archaeological research permit • It is recommended that a Chance Finds Protocol be drafted and implemented	1	1	1	2	Negative Low (-5)

9.3.10 Traffic Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
There is likely to be an increase in traffic from construction vehicles.	1	2	2	3	Negative Medium (-8)	• 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.	1	1	1	2	Negative Low (-5)
OPERATIONAL											
The proposed development would have an impact on the current road network.	2	4	3	2	Negative High (-11)	• The road upgradings and access recommended by the Traffic Engineers to be implemented.	2	4	1	1	Negative Medium (-8)

						• Public Transport and pedestrian facilities to be provided according to TIA					
CUMULATIVE											
The proposed development together with other developments in the region would have a significant impact on the current road network						• Traffic control measures at intersections along the main roads will have to be changed once more development occurs in the region					

9.3.11 Socio-Economic Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Employment											
The development will result in job creation and provision of employment.	1	2	1	3	Positive Medium (+7)	• 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.	1	2	1	3	Positive Medium (+7)
The development will lead to increased rates and taxes accruing to the local municipality.	1	2	1	3	Positive Medium (+7)						
Safety											
Public safety during construction.	1	2	2	2	Negative Medium (-7)	• Members of the public adjacent to the construction site should be notified of construction activities in order to limit	1	2	1	1	Negative Low (-5)

						unnecessary disturbance or interference. • Construction activities will be undertaken during daylight hours and not on Sundays.					
Construction staff safety during construction. Where sourcing of local labour is not possible, "outsiders" may need to be employed in order to address skills shortages. On-site accommodation may lead to social disturbances in the area and will also require additional service provisioning measures.	1	2	2	3	Negative Medium (-8)	• 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.	1	2	2	1	Negative Low (-6)
OPERATIONAL											
Employment											
• The development will result in job creation and provision of employment. • Jobs for the maintenance of infrastructure and services will be created following the completion of the development. These jobs might be made available to existing labour there creating long term employment. • Service contractors could have access to other developments or projects in the area thereby creating long term employment. • Job creation associated with the Business, Industrial, Institutional and Educational land uses.	2	3	2	4	Positive High (+12)						
Provision of housing											
• Provision of a much-needed affordable housing	2	3	3	4	Positive High (+12)						
Increased rates and taxes											

• The development will lead to increased rates and taxes accruing to the local municipality.	1	2	1	3	Positive Medium (+7)						
Provision of Educational and Institutional facilities											
• Provision of institutional, including hospital, and educational facilities	2	3	3	4	Positive High (+12)						

9.3.12 Infrastructure Impacts

Where E = Extent, D = Duration, I = Intensity and P = Probability of occurrence.

Potential Aspect and / or Impact	Before Mitigation				Significance Rating (before mitigation)	Mitigation and management measures	After Mitigation				Significance Rating (after mitigation)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
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	1	3	2	2	Negative Medium (-8)	Mitigation measures supplied in the EMPr must be adhered to.	1	1	1	2	Negative Low (-5)
Provision of services and infrastructure	2	4	2	2	Negative High (-10)	• Upgrading of services and infrastructure required • Availability of services for all phases to be confirmed • Increased stress on municipal bulk services	1	3	2	2	Negative Medium (-8)
OPERATIONAL											
The project will result in the upgrade of infrastructure and services in the area	2	3	3	4	Positive High (+12)						

TABLE 13: SUMMARY OF IMPACT ASSESSMENT AFTER MITIGATION

CONSTRUCTION PHASE (LAYOUT PROPOSAL)

Impact Description	Intensity	Extent	Duration	Probability it would occur	Significance rating After Mitigation
Geotechnical constraints such as collapsible soils, seasonal seepage water, soil heave, highly compressible upper soils, erodibility of soils, excavation difficulty, steep slopes and areas subject to flooding may negatively affect the construction phase and installation of services.	1	2	1	2	Low
Stability of structures	1	1	1	1	Low
Topography: Surface gradient	1	2	1	2	Low
Alteration of topography due to stockpiling of soil, building material and debris and waste material on site.	1	2	1	2	Low
Hydrogeology: Groundwater contamination	2	4	1	2	Medium
Hydrology: Erosion due to increased urban runoff	2	1	1	1	Low
Flood risk	2	1	1	1	Low
Impeding & impounding of watercourses	1	1	2	1	Low
Impact on Natural Habitat	1	2	2	2	Medium
Loss of sensitive species	1	1	2	1	Low
Loss of corridors of particular conservation concern	1	1	2	1	Low
Possible disturbance, trapping, hunting and killing of vertebrates	1	2	1	1	Low
Exposed soil at riparian zone; then soil prone to compaction or potential erosion.	1	2	1	1	Low
Waste Management	1	2	1	2	Low
Impact of odour, Noise, Safety and Dust	2	1	1	2	Low
Impact on Cultural Heritage Resources	1	1	1	2	Low
Traffic Impact	2	2	1	1	Low
Impact of Labourers	1	2	2	1	Low
Economic Impacts This will be a POSITIVE impact Job creation	1	2	1	3	Medium
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	1	1	1	2	Low

OPERATIONAL PHASE (LAYOUT PROPOSAL)

Impact Description	Intensity	Extent	Duration	Probability Probability it would occur	Significance rating After Mitigation
Geotechnical constraints such as collapsible soils, seasonal seepage water, soil heave, highly compressible upper soils, erodibility of soils, excavation difficulty, steep slopes and areas subject to flooding may negatively affect the operational phase and installation of services in the phased development.	1	4	2	2	Medium
Hydrogeology: Leaks of untreated water from pipelines may occur and impact on the groundwater quality.	1	2	1	2	Low
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.	1	2	1	2	Low
An increased infestation of exotic or alien invasive plant species owing to clearance or disturbance where the footprint took place.	1	2	1	2	Low
Waste management	2	1	1	2	Low
Infestation by Alien vegetation	1	2	1	2	Low
Traffic: The proposed development would have an impact on the current road network.	2	4	1	1	Medium
Economic Impacts This will be a POSITIVE impacts Job creation	1	2	1	3	High
Increased rates and taxes accruing to the local municipality	1	2	1	3	Medium
Provision of a much needed affordable housing	2	3	3	4	High
Provision of institutional, including hospital, and educational facilities	2	3	3	4	High
The project will result in the upgrade of infrastructure and services in the area	2	3	3	4	High

9.4 Comparative Assessment of Alternatives

Table 14 provides a comparative assessment of the two Layout Alternatives options i.e. Layout Alternative 1 (encroachment of the high ecological sensitive areas i.e. rocky slopes and their buffer zones at the southwestern parts of the site as well as the area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* was observed) and Layout Alternative 2 (Layout Proposal) (conservation of the high ecological sensitive areas i.e. rocky slopes and their buffer zones at the southwestern parts of the site as well as the area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* was observed).

For many of the specialist fields, except for the ecological habitat, the potential impacts for the different project phases (construction and operations) for the two Layout alternative options are relatively the same and have been combined to prevent repetition.

The comparative assessment below takes into account the impact assessment provided in Section 9.3.

TABLE 14: COMPARATIVE ASSESSMENT OF THE TWO LAYOUT ALTERNATIVE OPTIONS AFTER MITIGATION

	Layout Alternative 1	**Layout Alternative 2**
Geology	-6	-6
	Geotechnical constraints such as collapsible soils, seasonal seepage water, soil heave, highly compressible upper soils, erodibility of soils, excavation difficulty, steep slopes and areas subject to flooding may negatively affect the construction phase and installation of services. The geological impacts before mitigation for both alternatives are of a **medium** significance and the post mitigation significance is **low**.	
Topography	-6	-6
	Alteration of topography due to stockpiling of soil, building material and debris and waste material on site. The potential impacts before mitigation for both alternatives are of a **medium** significance and the post mitigation significance is **low.**	
Hydrogeology	-6	-6
	The possibility of Groundwater contamination due to construction activities for both alternative options exist, and the mitigation measures listed in the EMPr, need to be complied with to reduce this impact from a **high** to a **low** rating.	
Hydrology	-5	-5
	Land disturbance and increased urban run-off could result in erosion for both alternatives. The potential impacts before mitigation for both alternatives are of a **medium** significance and the post mitigation significance is **low.**	
Vegetation and Fauna	-12	-6
	Habitat loss, loss of indigenous species due to clearing of vegetation. The potential impacts before mitigation for Alternative 1 is of a **high** significance and the post mitigation significance remain **high** due to the impact on the ecological areas of high sensitivity i.e. rocky slopes and Near Threatened plant species *Searsia gracillima* var. *gracillima***.** The potential impacts before mitigation for Alternative 2 is of a **high** significance and the post mitigation significance is **low** due to the conservation of ecological areas of high sensitivity i.e. rocky slopes and Near Threatened plant species *Searsia gracillima* var. *gracillima.*	
Loss of sensitive species	-12	-6
	Loss of a protective species i.e. *Sclerocarya birrea* (Marula) and Near Threatened plant species *Searsia gracillima* var. *gracillima.* The potential impacts before mitigation for Alternative 1 is of a **high** significance and the post mitigation significance remain **high** due to the impact on the ecological areas of high sensitivity i.e. rocky slopes and Near Threatened plant species *Searsia gracillima* var. *gracillima***.** The potential impacts before mitigation for Alternative 2 is of a **high** significance and the post mitigation significance is **low** due to the conservation of ecological areas of high sensitivity i.e. rocky slopes and Near Threatened plant species *Searsia gracillima* var. *gracillima.*	
Waste	-6	-6
	During construction, impacts such as contamination of the surface and site with general and hazardous waste are applicable to both alternative. The mitigation measures included in the EMPr must be complied with to achieve the post-mitigation significance rating of **low.**	
Air Quality	-6	-6
	Dust and emissions during construction generated by debris handling and debris piles, truck transport, bulldozing and general construction will exist for both the alternatives. The post-mitigation significance rating is **low.**	

Noise Construction	-5	-5
	During the construction phase there is likely to be an increase in noise pollution from construction vehicles and construction staff. The post-mitigation significance rating is **low.**	
Heritage Construction	-5	-5
	Disturbance of graves and sites of archaeological, historical and cultural significance could take place during construction. The mitigation measures included in the EMPr must be complied with to achieve the post-mitigation significance rating of **low.**	
Traffic Construction	-5	-5
	During the construction phase there is likely to be an increase in traffic from construction vehicles. Construction vehicles are to avoid main roads during peak traffic hours and mitigation measures outlined in the EMPr are to be implemented. The post mitigation significance for both alternatives is **low.**	
Socio-economic Construction	+7	+7
	The development will result in a significant number of construction phase jobs for the local people. The significance rating is **medium.**	
	-5	-5
	Construction staff and public safety during construction. The post mitigation significance is **low.**	
TOTAL	-79 +7	-66 +7

Based on the comparative assessment of the two layout alternative options and the impact identification and assessment, it is evident that there is a difference in the negative impacts for the alternative options: -79 for Layout Alternative 1 (encroachment of areas of high ecological sensitivity) compared to -66 for Layout Alternative 2 (conservation of areas of high ecological sensitivity).

Layout Alternative 2 (conservation of areas of high ecological sensitivity) is regarded as the preferred layout alternative.

The majority of the negative impacts, which have contributed to the greater impact rating score for Layout Alternative 1, pertain to the impact on high ecological sensitive areas i.e. rocky slopes and their buffer zones at the southwestern parts of the site as well as the area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* was observed on site.

10 ENVIRONMENTAL IMPACT STATEMENT

10.1 Conclusions

The findings conclude that there are no environmental fatal flaws that could prevent the proposed New Eersterus X 15 development if the recommended mitigation and management measures contained in the preceding chapter and EMPr (Appendix F) are implemented.

The results of the impact assessment indicate that the most significant impacts as a result of the proposed project would include the following:

PHYSICAL ENVIRONMENT

Geology

From a geotechnical point of view the majority of the site is regarded as suitable for the proposed development.

A number of general geotechnical constraints were identified that will require design precautionary measures.

Flood risk can be expected in areas and should be refined by the relevant specialist assessments.

Mitigation and management measures and foundation recommendations supplied by the geotechnical engineer are included in the EMPr (Appendix F).

Geohydrology

Groundwater contamination due to construction activities, disposal of waste water and sewage systems.

Recommendations and mitigations measures are included in the EMPr.

BIOLOGICAL ENVIRONMENT

The most significant ecological impacts are the loss of habitat due to the clearing of vegetation, loss of sensitive species and loss of corridors of particular conservation concern.

The non-perennial rivers at the site, with in-channel dams, their riparian zones and buffer zones, are likely to be impacted by the proposed development, but to a very limited extent by road- and bridge crossings and the installation of services.

Extensive excavations and groundworks have transformed large parts of the site, including areas at and along the riparian zones at the site. At some parts the active channel and riparian zone of the tributaries are difficult to follow, and the connectivity broken up. Informal settlements are spreading in the north-western part of the site. The degradation of the site is not only clearly visible on land but also in a comparison of Google Earth Pro images of the past (2004) and at present (2023). The proposed development will prevent further degradation of the site due to excavations and further invasion by informal settlements.

Urban edge effects, including pollution of the non-perennial rivers that run into the site from Soshanguve, are visible at the western parts of the site.

Slopes of rocky ridges at the southern parts of the site contains vegetation in fairly good condition, with a diversity of indigenous plant species. Slopes of rocky ridges which enter the southern parts of the site are excluded from the proposed footprint and forms part of a conservation area at the site and south of the site.

The site is part of the savanna vegetation type, Central Sandy Bushveld (SVcb 12) which is not listed as threatened according to the National List of Threatened Ecosystems (2011). No Threatened animal- or plant species appear to be resident at the site.

The Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found in the south-eastern parts of the site. This part of the site is excluded from the development so that *Searsia gracillima* is not anticipated to be affected.

One protected tree species *Sclerocarya birrea* (Marula), is sparsely distributed at the site. A permit at the relevant authorities should be applied for in case of any damage or removal of individual trees of *Sclerocarya birrea* (Marula) trees, if the development is approved.

No wetlands are present at the site. Non-perennial rivers, with their active channels and riparian zones, and artificial waterbodies, mostly in-channel dams, with groundwalls, are present at the site. Water gathers at numerous excavations at the site. Large scale removal of soil modified or transformed large parts of the active channels and riparian zones of the non-perennial river systems at the site. At some parts the active channel and riparian zone of the tributaries are difficult to follow, and the connectivity broken up. (Reconstruction of active channels and riparian zones are imperative in many areas. Where the active channel routes have been destroyed these should be reconstructed to link the riparian systems at the site.

The site is not part of a Freshwater Ecosystem Priority Area (FEPA) or wetland cluster (Nel et al., 2011a, 2011b).

The Ecological Specialist recommended a 32 m buffer zone along the non-perennial rivers and water bodies due to the fact that the watercourses are seriously modified ((PES) of the non-perennial rivers at the site is CATEGORY E). A 32m buffer zone would also assist in the prevention of further degradation and transformation of the site due to further excavations and groundworks and invasion by informal settlements.

No development (except installation of services and construction of roads and bridges) to take place within the 1:100 year flood line areas or 32m buffer zones along the non-perennial rivers.

According to the Ecological Fauna and Flora Habitat Survey the ecological sensitivity at most of the site is medium. The ecological sensitivity at increasingly larger parts of the site is low. Some of the terrestrial areas are of low sensitivity where these terrestrial areas have been degraded and transformed by extensive excavations and groundworks as well as informal settlements. Ecological sensitivity at the non-perennial rivers, their riparian zones and buffer zones as well as the artificial waterbodies at the site is high. The main reason for the high sensitivity of the active channel and riparian zones is only based on their importance as conservation corridors and not on the poor current state of the active channels and riparian zones. Rocky slopes and their buffer zones at the southwestern parts of the site are also of high ecological sensitivity. The area where the Near Threatened plant species *Searsia gracillima* var. *gracillima* has been found at the site, is of high ecological sensitivity.

Mitigation measures supplied by the Ecological Specialist are included in the EMPr (Appendix F).

SOCIO-ECONOMICAL ENVIRONMENT

Existing and Surrounding Land Use

The site is currently vacant land except with for a portion of around 80 ha on the north-western corner that has been subject to land invasion of approximately 2000 (structures). Various uncontrolled and illegal sand mining has occurred on the land and the enforcement to stop is being implemented at present but seems to be very hard to manage and control.

The area to the north of the site is earmarked for Urban Development and strategically located between the R80 (future PWV 9) and Bultfontein Road, which links up with the N4 Platinum Road. The site is bordered on 2 sides (north and west) by the Tshwane Urban Edge. For some unknown reason the existing Urban Edge only includes about 86 ha of the land (in the north-eastern corner) and the remainder is located in a management Zone. Huge tracks of land to the northeast of the site have been included into the Urban Edge (almost 3000 ha) despite of the fact that large commercial agriculture activities exist on this included land.

The township establishment application with the proposed township area on the land seeks to re-address this situation as to include and approve a township of mega scale on land which is not high potential agricultural land and is more strategically located than the forementioned areas.

The City of Tshwane Human Settlements Department has already consented and is supporting the proposed township and the departure of the policy.

The proposed development will be in line with surrounding land uses.

Cultural heritage sites

A number of Stone Age sites and occurrences (scatters of Middle Stone Age tools) were identified in the area by the Heritage Specialist. These are located in the area where large-scale sand quarrying is currently undertaken and although two of these sites are deemed to be more in-situ the impact of the sand quarrying is deemed to have disturbed and destroyed a large number of sites and occurrences. The sites are also located fairly close to the river/stream beds in the area and it is unlikely that the planned township development will be located here.

The possible existence of Bafokeng stone-walled sites in the southern section of the site were brought to the attention of Mr. Cappie Linde by the Bultfontein Land Use Committee before he passed away. These sites were not noticed by the Heritage Specialist during the initial surveys. However, some circles that presumably represent these sites can be seen on aerial images (Google Earth) of the area, with some also visible outside of the area. At this stage the Heritage Specialist cannot determine without a doubt whether these features are indeed stone-walled remnants of Bafokeng settlement, but based on the aerial imagery it seems highly likely. These sites will have to be mitigated during Phase 2 Archaeological work should the proposed development impact on them.

The mitigation measures supplied by the Heritage Specialist are included in the EMPr (Appendix F).

Availability of services and infrastructure

A phased approach towards services provisioning is being proposed by the involved Civil Engineers in order to provide access to residential erven as fast as possible whilst utilizing available services and available access as far as possible.

Water:

The capacity to supply and upgrade major water infrastructure to the development has been confirmed by the consultants responsible for the master planning for the City of Tshwane (GLS Engineers). The distribution of the water to the proposed development will be a bulk supply cost for the developer due to the approximately supply line and infrastructure that needs to be installed for the development. This will however be done in several stages and over a period of years to come. It is however crucial in the planning for the next 10 years to give attention to the budgeting requirements.

This future planning and phased approach confirmation by the Engineers will open up the area as indicated in the Urban edge for development in future.

In comments on the Township Establishment application from Water and Sanitation (Region B), CoT, it is confirmed that the site has existing water services available in the vicinity. The onus rests with the Professional Consulting Civil Engineer appointed by the Developer, to determine and confirm that the available municipal water supply is sufficient for the proposed development. All link water networks required to connect the proposed new services to the existing municipal network will be constructed to the satisfaction of the CoT, at the expense of the Developer.

Sewer:
Bulk sewer for the proposed mega township is very complicated at present and different scenarios need to be looked at in the bigger scheme. The consultants GLS Engineers as well as Encotech Engineers have looked at various options and recommendations and this need to be finalized on submission and implementation when a fist phase or extension is to be developed.

In comments on the Township Establishment application from Water and Sanitation (Region B), CoT, it is stated that the Priority Area with respect to sewerage is determined and defined as any area within 100m from an existing municipal sewer that has the capacity to accommodate the proposed development. Any proposed development lying beyond this area will automatically be regarded as "leapfrog" development. The onus rests with the Developer's Consulting Civil Engineers to determine whether the proposed development can be sewer under gravitation. The Developer's Consulting Civil Engineers must also submit proof that the existing municipal sewer, to which the proposed development may connect, can accommodate the additional flow.

Stormwater:
According to the Encotech Consulting Engineers the proposed development can be successfully developed from a stormwater run-off and handling perspective as long as the precautionary measures are implemented in the detail design.

Electricity:
City of Tshwane Energy and Electricity Department approved the application for point of supply as part of the New Eersterus X15 Township Establishment application. It is confirmed that capacity will be available once the upgrade of the Soshanguve Primary substation is completed.

Solid waste:
A waste management plan to be compiled and implemented.

<u>Traffic Impacts</u>
The proposed development would have an impact on the current road network. The recommended access arrangements, road upgrades and public transport and pedestrian facilities must be implemented.

<u>Need and desirability</u>
The need and desirability for a mixed-use Mega City development, including a large number of affordable housing (Residential 1, Residential 3 and Residential 4), business, industrial, educational and institutional facilities (including a hospital), in the area had been confirmed.

<u>Socio-economic</u>
The proposed development will create employment opportunities during both the construction and operational phase.

The development will lead to increased rates and taxes accruing to the City of Tshwane Metropolitan Municipality and contribute to the upgrade of infrastructure and services in the area.

Conclusion

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.

10.2 Recommendations

Based on the assumption that the mitigation measures will be effectively implemented for the proposed New Eersterus X 15 development 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.

It is recommended that the proposed layout (Layout Alternative 2), included as Figure 3 and Appendix B of this report, be approved. The proposed layout allows for the conservation of areas with high ecological sensitivity, 32m buffer zones along the non-perennial rivers and artificial water bodies and the 1:100 year flood lines. The Ecological Specialist recommended a 32 m buffer zone along the non-perennial rivers due to the fact that the watercourses are seriously modified. A 32m buffer zone would assist in the prevention of continuous degradation and transformation of the site due to further excavations and groundworks and invasion by informal settlements.

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 EIA study are included within the EMPr (Appendix F).

In addition, the following key conditions should be included as part of the authorisation:

- The EMPr (attached in Appendix F) must be implemented and complied with to ensure the minimisation, control and mitigation of construction phase impacts.
- Compliance with the EMPr should be evaluated and audited by an independent, appropriately qualified and experienced ECO, on a monthly basis, as a minimum.
- The implementation of a site-specific Stormwater Management Plan that had been approved by the local municipality.
- The compilation and implementation of a Waste Management Plan.
- The availability of services to be confirmed.
- All recommendations made by the specialists in reports compiled for this development should be adhered to at all times.

10.3 Proposed Duration of Environmental Authorisation

If granted, the environmental authorisation is required for a period of at least ten years.

10.4 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.