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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (DEIA) REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

PROPOSED TERTIARY EDUCATION AND MIXED-USE PRECINCT DEVELOPMENT AT THE GARDEN ROUTE DAM AND ASSOCIATED INFRASTRUCTURE ON A PORTION OF THE REMAINDER OF ERF 464, GEORGE

Application in terms of the National Environmental Management Act of 1998 (Act No. 107 of 1998), as amended, and the 2014 Environmental Impact Assessment (EIA) Regulations, as amended.

APPLICANT:	George Municipality Contact: Ms D Power
ENVIRONMENTAL CONSULTANT:	Sharples Environmental Services cc Betsy Ditcham (EAPASA: 1480)
DEA & DP PROJECT REFERENCE:	16/3/3/2/D2/19/0000/22
SES REFERENCE NUMBER:	21/GRD/DEIAR/02/2022
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Expertise

Sharples Environmental Services cc (SES) is an independent environmental consultancy and has since 1998 been actively engaged in the fields of environmental planning, assessment and management. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale PV and CPV renewable energy facilities, residential estates, resorts and golf courses to municipal service infrastructure installations and the planning of major arterials. SES has offices in George and in Cape Town.

Author of Report: BETSY DITCHAM (Director and Principle Environmental Assessment Practitioner) - Betsy has a Bachelor of Science Honours Degree in Wildlife Management from the University of Pretoria and a Bachelor of Science Degree (Zoology and Ecology) obtained from the University of Cape Town in 2005. She has 9 years' experience in the environmental field, including environmental assessments, legal compliance, on-site compliance monitoring, cleaner production and business greening and sustainability (carbon and environmental footprinting). In her time as a consultant, she has compiled a number of environment assessments and management plans for both private and governmental clients. Betsy is a shareholder of SES and registered with EAPASA as a certified Environmental Practitioner (EAPSA # 1480).

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GLOSSARY OF TERMS

Activity - An activity or operation carried out as part of the construction or operation of the housing development and associated infrastructure.

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.

Anthropogenic Impacts - Impacts originating in human activity, e.g. pollution, mining, destruction of vegetation etc.

Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Consultation - A process for the exchange of views, concerns and proposals about a proposed project through meaningful discussions and the open sharing of information.

Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.

Cumulative Impact: The impact of an activity that by itself may not be significant but combined with other existing and potential future impacts may be significant.

Department of Environmental Affairs and Development Planning (DEA&DP) - The Provincial Directorate of the National Department for Environmental Affairs and Tourism. This Department is responsible for evaluating the viability of the development proposal and issuing the appropriate Authorisation**.**

Ecology - The study of the interrelationships of organisms with and within their environment.

Ecosystem - The interconnected assemblage of all species populations that occupy a given area and the physical environment with which they interact.

Endemic / Endemism - Found only within the study area / tendency of being found only in the study area.

Environment - The surroundings within which humans exist and that are made up of

i. The land, water and atmosphere of the earth;
ii. Microorganisms, plant and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation – The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-

ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental impact - An environmental change caused by some human act.

Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.

Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Authorisation.

Fauna - The collective animals of a region.

Flora - The collective plants growing in a geographic area.

Heritage resource - A building, area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations.

Hydrological - (The study of) surface water flow.

Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Integrated Environmental Management - The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.

Interested and Affected Party (I&AP) – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

Mitigation Measures - Design or management measures that are intended to avoid and/or minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 324, R 325, R 326 and R 327 in the Government Gazette of 7th April 2017 refer).

No-go alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo.

Operations Phase - The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Red Data List - Species of plants and animals that because of their rarity and/or level of endemism are included on a Red Data List (usually compiled by the International Union for Conservation of Nature (IUCN)) which

provides an indication of their threat of extinction and recommendations for their protection.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP 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.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail.

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist Study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable Development - Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
BEE	Black Economic Empowerment
BNG	Breaking New Ground
CA	Competent Authority
CBA	Critical Biodiversity Area
DEA&DP	Department of Environmental Affairs & Development Planning
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area
HOA	Home Owners' Association
HWC	Heritage Western Cape
I&AP	Interested and Affected parties
IDP	Integrated Development Plan
LUPO	Land Use Planning Ordinance (Ordinance 15 of 1985)
NEMA	National Environmental Management Act, 1998
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
PPP	Public Participation Process
SANS	South African National Standard
SDF	Spatial Development Framework
SES	Sharples Environmental Services cc
TIA	Traffic Impact Assessment
VIS	Visual Impact Statement
WCPSDF	Western Cape Provincial Spatial Development Framework
ZVI	Zone of Visual Influence

REQUIRED CONTENT OF AN ENVIRONMENTAL IMPACT ASSESSMENT REPORT AS PER THE 2014 NEMA EIA REGULATIONS, AS AMENDED

Appendix 3 of Government Notice 326 of the National Environmental Management Act No.107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations (2014), as amended, states the requirements for the content of an Environmental Impact Assessment Report to be as follows:

"An Environmental Impact Assessment Report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include – "

Table 1 below lists the content requirements of an EIA Report and where in the EIA Report one can find the required content.

Table 1: Required content of an Environmental Impact Assessment Report according to the 2014 NEMA EIA Regulations, as amended, and a quick reference guide as to where to find the required content in this EIA Report.

REQUIREMENT	SECTION IN REPORT
a) details of- **(i) the EAP who prepared the report; and** **(ii) the expertise of the EAP, including a curriculum vitae;**	Section 1.3
b) the location of the activity, including- **(i) the 21-digit Surveyor General code of each cadastral land parcel;** **(ii) where available, the physical address and farm name;** **(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;**	Table 8: Summary Table: Site and Farm Details
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is- **(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or** **(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;**	APPENDIX A: SITE LOCALITY MAP Table 8: Summary Table: Site and Farm Details
(d) a description of the scope of the proposed activity, including- **(i) all listed and specified activities triggered;** **(ii) a description of the activities to be undertaken, including associated structures and infrastructure;**	Table 2: Listed Activities in the NEMA EIA Regulations, 2014 Section 4: Description of the Proposed Project
(e) a description of the policy and legislative context **within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;**	Section 3: Legislation and Policy Pertaining to the Application.
(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 location;**	Section 2: Project Need and Desirability

REQUIREMENT	SECTION IN REPORT
(g) a motivation for the preferred development footprint **within the approved site;**	Section 6.2: Concluding Statement Regarding Alternatives
(h) a full description of the process followed to reach the proposed development footprint within the approved site, including - **(i) details of all the development footprint alternatives considered;** **(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;** **(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;** **(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;** **(v) the impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-** **(aa) can be reversed;** **(bb) may cause irreplaceable loss of resources; and** **(cc) can be avoided, managed or mitigated;** **(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;** **(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;** **(viii) the possible mitigation measures that could be applied and level of residual risk;** **(ix) if no alternatives development footprint locations for the activity were investigated, the motivation for not considering such; and** **(x) a concluding statement indicating the preferred alternative development location within the approved site;**	Section 6.1: Description of the Process Followed to Reach the Preferred Alternative. (i) Section 6.1.1: Mixed Use Development Site Location and Layout Alternative (ii) Section 7: Public Participation Process and APPENDIX E: PUBLIC PARTICIPATION (iii) Section 7: Public Participation Process and Appendix I: Comments and Response Tables (iv) Section 5: Description of the Affected Environment (v) Section 8: Impacts (vi) Section 8.3: Methodology Used in Determination of the Significance of Potential Impacts (vii) Section 8: Impacts and Section 8.1 Summary of Impacts Identified (viii) Section 8.5: Description and Assessment of the Significance of Impacts Prior and After Mitigation and APPENDIX M: ENVIRONMENTAL MANAGEMENT PROGRAMME (ix) Section 6.1: Description of the Process Followed to Reach the Preferred Alternative (x) Section 6.2: Concluding Statement Regarding Alternatives
(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 location through the life of the activity, including –** **i) a description of all environmental issues and risks that were**	Section 8.3: Methodology Used in Determination of the Significance of Potential Impacts Section 8: Impacts

REQUIREMENT	SECTION IN REPORT
identified during the environmental impact assessment process; and **ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;**	
(j) an assessment of each identified potentially significant impact and risk, including- **(i) cumulative impacts;** **(ii) the nature, significance and consequences of the impact and risk;** **(iii) the extent and duration of the impact and risk;** **(iv) the probability of the impact and risk occurring;** **(v) the degree to which the impact and risk can be reversed;** **(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and** **(vii) the degree to which the impact and risk can be mitigated;**	Section 8.4.4 Cumulative Impacts Section 8: Impacts Section 8.5: Description and Assessment of the Significance of Impacts.
(k) where applicable, a summary of the findings and recommendations of any specialists 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;**	Section 8.4: Summary of Key Findings & Recommendations of Specialist Assessments
(l) an environmental impact statement which contains- **(i) a summary of the key findings of the environmental impact assessment:** **(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructures on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and** **(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;**	Section 9: Environmental Impact Statement Section 9.1: Summary of Key Findings of Impact Assessment APPENDIX D2: CRITICAL BIODIVERSITY AREAS (CBA) MAP
(m) **based on the assessment, and where applicable, recommendations from specialist report, the** recording of proposed impact management objectives, and the impact management outcomes for the development **for inclusion in the EMPr as well as for inclusion as conditions of authorisation;**	Section 8.5: Description and Assessment of the Significance of Impacts Prior and After Mitigation
(n) the final proposed alternatives **which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;**	Section 6: Alternatives
(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**	Section 9.3: Recommendations for Conditions of the Environmental Authorisation
(p) a description of any assumptions, uncertainties and gaps in knowledge **which relate to the assessment and mitigation**	Section 1.2: Assumptions and Limitations

REQUIREMENT	SECTION IN REPORT
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 of that authorisation;	Section 9.2: EAP's Reasoned Opinion and Recommendations Section 9.3: Recommendations for Conditions of the Environmental 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;	N/A – this activity does include operational aspects.
(s) an undertaking under oath or affirmation by the EAP in relation to: **(i) the correctness of the information provided in the reports;** **(ii) the inclusion of comments and inputs from stakeholders and I&APs;** **(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and** **(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;**	APPENDIX N: DECLARATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER
(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A – It is not proposed to decommission this development.
(u) an indication of any deviation from the approved scoping report, including the plan of study, including- **(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and** **(ii) a motivation for the deviation;**	N/A – No deviation of POSEIA.
(v) any specific information that may be required by the competent authority; and	Appendix E13: Proof of Correspondence with DWS
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

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EXECUTIVE SUMMARY

Project Overview

George Municipality proposes to develop a tertiary education precinct, housing, student accommodation, sports fields and recreational open spaces on a portion of the remainder Erf 464, near the Garden Route Dam in George. The site is currently registered as an erf within the urban development boundary (George MSDF 2019) but outside the present urban area ; zoned as "Undetermined", thus the activity / development is currently not permitted according to the existing land use rights. An application to obtain the required land use rights is underway.

The Public Open Spaces account for > 57% of the development proposal. The following is proposed to be developed as per the Site Layout Plans:

Table 3: Size and number of each respective aspect proposed

Development Proposed	No.	Size (ha)	%
Community Zone 1: Campus – University / Research Institute / Academy	8	13.66	12%
Business Zone 1: Waterfront Commercial Development	1	4.15	4%
General Residential Zone 6: Hotel	1	1.55	1
General Residential Zone 2: Medium Density Residential / Group Housing	3	5.47	5%
General Residential Zone 4: Apartments / Flats / Student Housing	4	4.84	4%
Single Residential Zone 1: Free Standing Dwelling Houses	91	5.76	5%
Open Space Zone 2: Recreation Spaces / Sports Fields	3	7.57	6%
Open Space Zone 3: Parks / Natural Assets / Preservation Areas	5	67.90	57%
Transport Zone 2: Roads	1	7.60	6%
TOTAL DEVELOPMENT FOOTPRINT		118.5	100%

Various bulk water, stormwater and sewer infrastructure upgrades are also proposed to be constructed to service the development.

Need & Desirability

The clear need for the project has been explained in detail in the Environmental Impact Assessment Report.

Barbour (2019) explains that the key role of education is highlighted in the National Development Plan 2030 (2011) (NDP). Chapter 9, Improving Education, Training and Innovation, outlines the key role played by education and supports the establishment of the proposed education facility in George.

According to the Town Planning Report (Aurecon, 2019), the Western Cape Provincial Spatial Development Framework (PSDF) builds on OneCape 2040's vision of "a highly-skilled, innovation driven, resource efficient, connected, high opportunity and collaborative society". For each of these societal attributes aspired to, OneCape 2040 identifies thematic 'big step' changes that need to take place.

With regards to the vision as set out by the Western Cape PSDF, the proposed development directly meets the vision in that it proposes to establish an educational institution / place of learning and innovation, with the

intentions of providing an opportunity to attain good quality education to all members of society. Furthermore, should this development proposal be accepted, the vision of 'Working Cape' will be addressed as a variety of short and long-term employment opportunities would be created through the proposed development, both during the construction and operational phases.

The proposed development will also contribute to 'Connecting the Cape' as the nature of the proposed development will not only attract people from all over George, but also all over the region, country and world, while simultaneously creating a unique area within which to work, live, learn and play.

The establishment of an education facility is also supported at a local level. The George Integrated Development identifies 5 Strategic Goal (SG). Linked to the SGs are a number of Departmental Objectives, of which the following support the proposed development:

- Identify an educational and research hub and to facilitate the continued growth of NMMU in George;
- Create and facilitate an enabling environment for economic development in George;
- Establish incubators, clusters and centres of excellence to contribute meaningfully to the demands of a growing economy. These centres can be linked to and benefit from the proposed university;
- Establish a Science Park. This can be linked to the proposed development of a university;
- Promote George as a sports tourism and business destination. The research from Stellenbosch has indicated that the University of Stellenbosch has contributed to establishing Stellenbosch as sports and business destination;

From a spatial perspective, the George SDF notes that the development of George should reinforce George city's regional service centre role through attracting higher order, high quality education and health facilities, regional government administration and commercial headquarters.

The proposed development is compatible with and supports the key principles and objectives contained in the relevant key land use planning and policy documents that pertain to the area. The area has therefore been identified as suitable for development.

According to the Town Planning Motivation (Aurecon, 2019) one of the biggest considerations for the decision to develop a university/research institute/academy on this site, was the need for inclusivity and benefit to a large portion of the population. The proposed university/research institute/academy would be fully inclusive and would encourage the use of its services to all members of society.

This proposed development would enhance the social opportunities for all members of society and would generate social upliftment in a way that very few other land uses would. There are currently no other institutes of this nature in George, thus this proposed institution would create a unique opportunity from which all members of George and further abroad could benefit. Education would also create social upliftment in the long term by indirectly addressing any unemployment issues in George. Therefore, it is envisioned that this development proposal would hugely contribute to social upliftment in George, both in the short and long term.

Barbour (2019), in his case studies, identified a range of additional benefits associated with a university. These include demand side impacts and supply side impacts.

In addition to quantifiable contribution to economic growth in the local economy, universities also serve as significant sources of cultural, recreational and social enrichment. In this regard, increasingly, attention is being placed on the role of so-called anchor institutions in the local, urban environment and the impact these institutions have on the development of a town or region in general.

University sport facilities can attract external sporting teams and the public, which attracts additional expenditure in the area through the need for accommodation, food and services.

Arts, culture and heritage have various positive social and economic impacts on a region, both tangible and intangible. Arts, culture and heritage make a tangible contribution to economic growth in a region through various avenues (including visitor expenditure, job creation and skills development) while the intangible benefits are difficult to quantify. This is because most people do not value arts, culture and heritage based on its economic and social benefits, but rather by the benefit it adds to their personal lives.

In order to address water efficiency in the proposed development, all toilets, taps and showers will have water use reducing measures installed, which would include aerators to reduce water flow and cistern weights to interrupt flush flow. In addition, the inclusion of renewable energy sources and green building principles as part of the design of the overall development will be investigated and actively encouraged.

Overall Findings of Specialist Impact Assessments & Feasibility Studies

The following specialist impact assessments were undertaken to inform the Scoping & EIA Process:

- **Agricultural** Compliance Statement
- **Biodiversity** Impact Assessment;
- **Aquatic** Impact Assessment;
- **Butterfly** Survey;
- **Socio-Economic** Impact Assessment;
- **Traffic** Impact Assessment; and
- **Visual** Impact Assessment

In addition, input was obtained from professional consultants (technical feasibility) in terms of providing:

- Civil Engineering & Services Assessment
- Town Planning Motivation Report
- Urban Design Report
- Stormwater Management Plan

None of the specialist impact assessment and technical feasibility studies identified any fatal flaws in the development. Overall, the broad consensus from the impact assessment specialists is that the impacts expected to occur as a result of this development can be either avoided entirely or reduced to an acceptable level of impact (in the low to low - medium range of significance) if all of their recommended mitigation measures are implemented. George Municipality is therefore committed to conducting the construction and operation phase of this development in line with the Environmental Management Programme, which includes the impact mitigation measures recommended by all of the specialists and the Environmental Assessment Practitioner.

Overall Findings of the EAP

In the professional opinion of Sharples Environmental Services cc, we believe that the development **should be authorised to go ahead** based on the following reasons:

The primary reason the development should be approved is because of the critical need to ensure that the site is developed in a sustainable manner and is maintained and improved as an open access area for both education and sporting activities in perpetuity.

The provision of an area where an accessible tertiary education campus can be develop is going to become ever more problematic as the move of up country residents to the Southern Cape continues.

- The proposed property to be developed is located entirely with the George Urban Edge and has been specifically set aside and planned for in various Municipal Planning Frameworks, including the SDF and IDP.
- The "No Go" alternative is the option of not developing the proposed campus and associated infrastructure development. The no-development option would result in a lost opportunity in terms of the employment opportunities associated with the construction and operation phase as well as the benefits associated with the provision of tertiary education for the community. A significantly high negative socio-economic impact significance would occur if the proposed development is not constructed in terms of the lost opportunity.
- The NO-GO alternative would result in the continued development pressure being applied to the site and at some stage in the future it will be developed as it is already in the urban edge. Should the site not be developed, one can expect the current limited use of the open area for running, cycling and fishing within the site will continue with the current level of security and safety concerns for the recreational users.
- The proposed development is compatible with and supports the key principles and objectives contained in the relevant key land use planning and policy documents that pertain to the Western Cape and George area, including the Western Cape Provincial Spatial Development Framework (2014), George Local Municipality Integrated Development Plan 2017-2022 and the George Local Municipality Spatial Development Framework (2019). The entire proposed development is also located within the Urban Edge. The proposed site has therefore been identified as a desirable site location for urban development.
- The most significant impacts associated with the proposed development, in the construction and operation phase, includes the expected impacts to the Freshwater Resources (habitat and biota), Botanical Impacts (loss vegetation of conservation importance) and the expected Visual Impact of the development in terms of the land use character of the site and "sense of place" of the area being significantly changed. Traffic and safety impacts are also noteworthy.
- The socio-economic benefits of the provision of a tertiary education campus including numerous job opportunities, the provision of housing and other much needed social facilities such as the hotel and sports facilities largely outweigh the biophysical, visual and traffic impacts identified in an area which is mostly disturbed and already transformed and planned for development purposes in the Municipal SDF (within the urban edge).
- We believe that a "balanced approach" to impacts has been undertaken. We believe that although the proposed project will result in varying degrees of negative impacts in terms of visual, botanical and especially freshwater impacts, we are of the opinion that the Preferred Alternative layout (Alternative 2) and mitigation measures proposed will ensure that these impacts are reduced to an acceptable level of impact significance based on the positive impact that this proposed development will have on the socio-economic environment.
- **Based on the findings of the EIA and the information presented by the specialists, the positive impacts of the preferred alternative outweigh the negative impacts of the NO-GO alternative and therefore the development should be authorised as long as the mitigation measures listed in this Report and the Environmental Management Programme are implemented.**

1. INTRODUCTION AND BACKGROUND

1.1. Background

George Municipality proposes to develop a tertiary education precinct, with related uses such as housing, student accommodation, sports fields and recreational open spaces on a portion of the remainder Erf 464, near the Garden Route Dam in George. The site is currently registered as an erf within the urban development boundary (George MSDF 2019) but outside the present urban area. An application to obtain the required land use rights is underway.

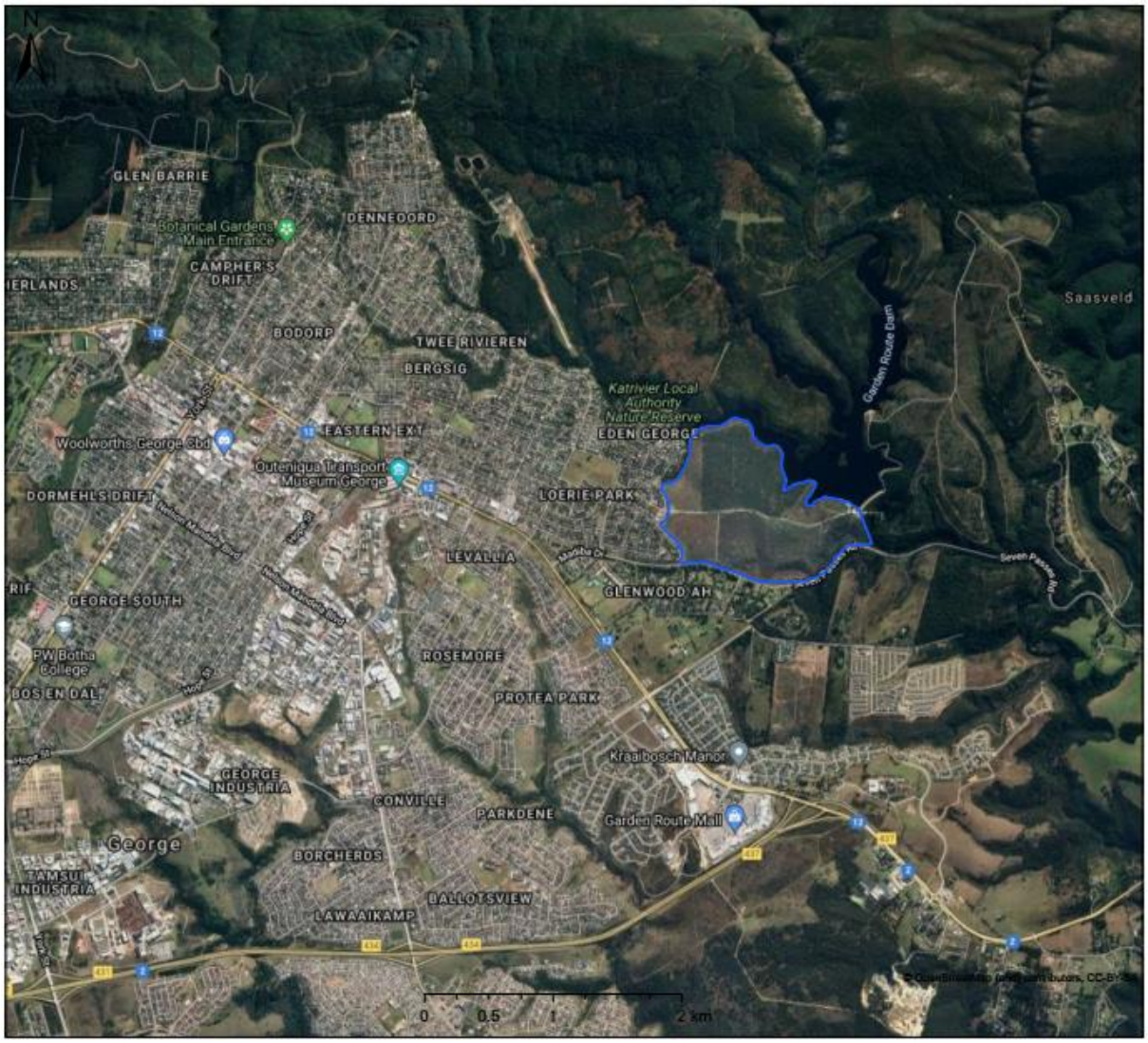


Figure 1: The proposed site for the development (blue border).

In 2014, the George Municipality initially proposed to develop residential houses on the Garden Route Dam Area. At the time, a survey was completed of the potential of the Garden Route Dam area for recreational uses and from this came the initial proposal. The previous Environmental Impact Assessment process for a development on this portion of land consisted the following:

- 211 single residential erven;

- Five group housing units (max density of 20 units/ha);
- Town housing unit (maximum density of 30 units/ha);
- One apartment of flat component (total coverage area of 1.6ha);
- The establishment of a hotel;
- The establishment of a tourism business site;
- Public open space area that would mainly be used for recreational purposes;
- The formalisation of the existing access road (dirt road) from Stander Street;
- The installation of associated service infrastructure

However, the EA, which was granted on 09 November 2015, only approved the following:

- The establishment of a hotel;
- The establishment of a tourism business site (waterfront);
- Public open space area that would mainly be used for recreational purposes;
- The formalisation of the existing access road (dirt road) from Stander Street;
- The installation of associated service infrastructure; and
- The rehabilitation and conservation of the remainder of the site

The layout for the abovementioned description can be viewed in Appendix C1.

The approval of only the Hotel and Waterfront meant that, due to economic and other factors, it would be very difficult to find the finances to construct either or both of the facilities. Since the Authorisation, the Municipality has received a number of requests for areas where a university precinct can be established. The George Municipality therefore appointed Zutari (Pty) Ltd, previously known as Aurecon South Africa (Pty) Ltd to prepare and submit a new application for rezoning and subdivision of the site for the purposes of a university precinct/research institute/academy in order to maximise the potential social, economic and environmental benefits on this site and to allow the entire community to harness these benefits.

After various feasibility studies, socio-economic analyses, stakeholder workshops and site visits with a range of specialists, a concept for this proposed university precinct/research institute/academy was developed.

1.2. Summary of Development Proposal

It is proposed to construct a tertiary education campus, with associated residential units and open spaces. The Public Open Spaces account for > 57% of the development proposal. The following is proposed to be developed as per the **Site Layout Plans** shown in **Appendix C** and in the **figures** below:

Table 4: Size and number of each respective aspect proposed

Development Proposed	No.	Size (ha)	%
Community Zone 1: Campus – University / Research Institute / Academy	8	13.66	12%
Business Zone 1: Waterfront Commercial Development	1	4.15	4%
General Residential Zone 6: Hotel	1	1.55	1
General Residential Zone 2: Medium Density Residential / Group Housing	3	5.47	5%
General Residential Zone 4: Apartments / Flats / Student Housing	4	4.84	4%
Single Residential Zone 1: Free Standing Dwelling Houses	91	5.76	5%
Open Space Zone 2: Recreation Spaces / Sports Fields	3	7.57	6%

Development Proposed	No.	Size (ha)	%
Open Space Zone 3: Parks / Natural Assets / Preservation Areas	5	67.90	57%
Transport Zone 2: Roads	1	7.60	6%
TOTAL DEVELOPMENT FOOTPRINT		118.5	100%

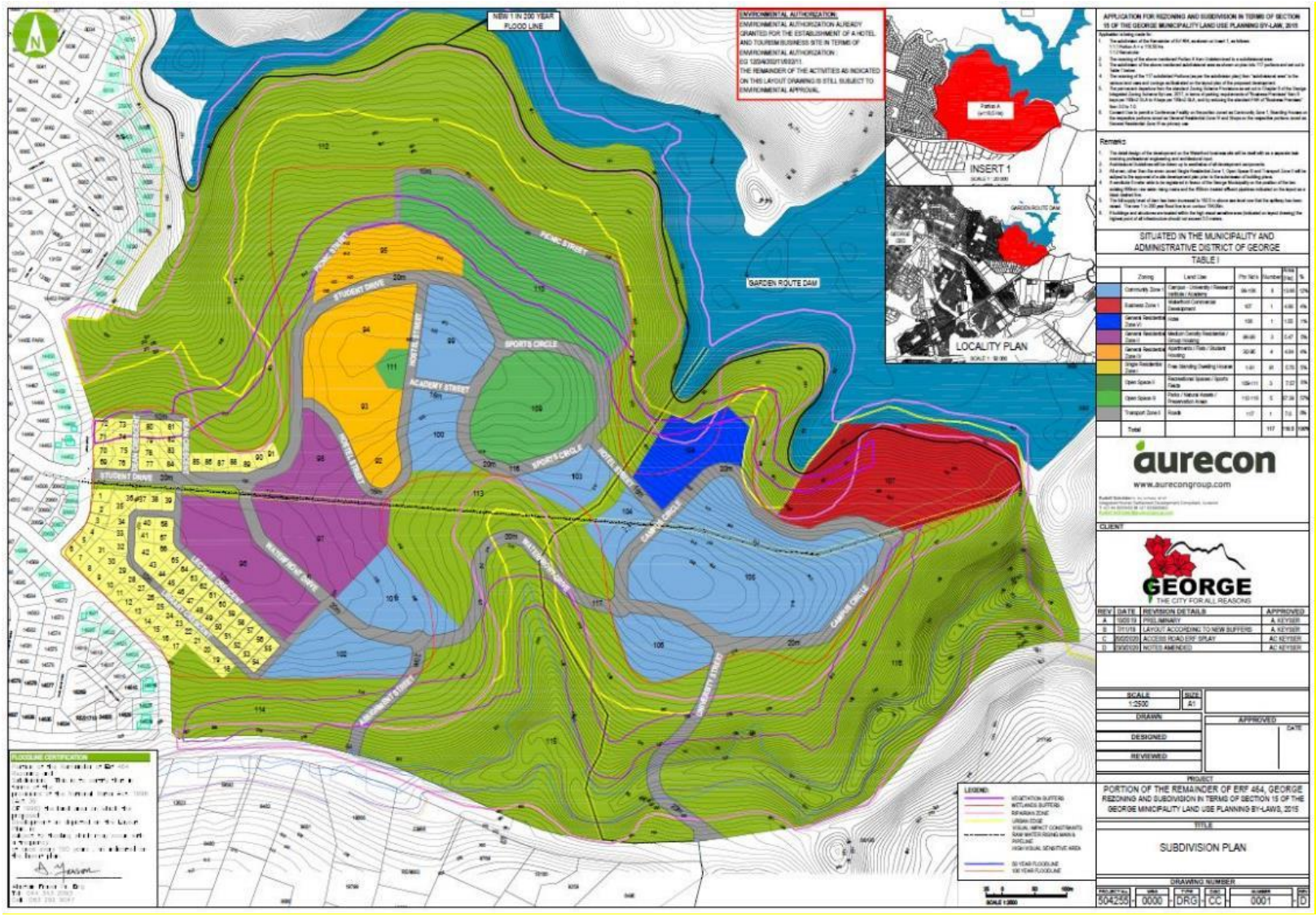


Figure 2: Proposed Preferred Site Layout Plan (as per Appendix C1)

1.3. Assumptions and Limitations

The findings of this report are subject to the following limitations:

- All information received from sources contributing to this project is assumed to be correct, unbiased and has been conducted by independent specialists;
- The proposed site layout is at this stage a conceptual layout that has taken various constraints on the development into account in order to avoid or minimise impacting on the environment. The detailed design phase within the development area will include more detail in terms of the proposed infrastructure to be developed (detail design plans), which may include minor changes in terms of erven and open space configuration and sizes, for example.

1.4. Details of the Environmental Assessment Practitioner

Sharples Environmental Services cc is an independent environmental consultancy and has since 1998 been actively engaged in the fields of environmental planning, assessment and management. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale PV and CPV renewable energy facilities, residential estates, resorts and golf courses to municipal service infrastructure installations and the planning of major arterials. SES has offices in George and in Cape Town.

The Principal EAP for this proposed development is **Betsy Ditcham.** Betsy has a Bachelor of Science Honours Degree in Wildlife Management from the University of Pretoria and a Bachelor of Science Degree (Zoology and Ecology) obtained from the University of Cape Town in 2005. She has 10 years' experience in the environmental field, including environmental assessments, legal compliance, on-site compliance monitoring, cleaner production and business greening and sustainability (carbon and environmental footprinting). In her time as a consultant, she has compiled a number of environment assessments and management plans for both private and governmental clients. Betsy is a part-owner and Director of SES and has received her registration as an Environmental Impact Assessment Practitioner from EAPASA (Reg No: 1480).

Please refer to **ANNEXURE J** to view the Curriculum Vitae for Betsy Ditcham (author of this report).

2. PROJECT NEED AND DESIRABILITY

2.1. Regional Need & Desirability

Barbour (2019) explains that the key role of education is highlighted in the National Development Plan 2030 (2011) (NDP). Chapter 9, Improving Education, Training and Innovation, outlines the key role played by education and supports the establishment of the proposed education facility in George.

The NDP notes that by 2030, South Africa needs an education system that includes an expanded higher-education sector that can contribute to rising incomes, higher productivity and the shift to a more knowledge-intensive economy. The NDP notes that the single most important investment any country can make is in its people. The aim of the NDP is that, by 2030, one in six people will be a university graduate. This is one of the strongest indicators of expanding access to university education. The NDP also highlights the importance and role of universities as centres of excellence and research and development.

According to the Town Planning Report (Aurecon, 2020), the Western Cape Provincial Spatial Development Framework (PSDF) builds on OneCape 2040's vision of "*a highly-skilled, innovation driven, resource efficient,*

connected, high opportunity and collaborative society". For each of these societal attributes aspired to, OneCape 2040 identifies thematic 'big step' changes that need to take place.

The PSDF envisages the spatial expression of these themes as follows:

- Educating Cape: Everyone has access to a good education, and the cities, towns and rural villages are places of innovation and learning.
- Working Cape: There are livelihood prospects available to urban and rural residents, and opportunities for them to find employment and develop enterprises in these markets.
- Green Cape: All households can access basic services that are delivered resource efficiently, residents use land and finite resources prudently, and safeguard their ecosystems.
- Connecting Cape: Urban and rural communities are inclusive, integrated, connected and collaborate.
- Living Cape: Living and working environments are healthy, safe, enabling and accessible, and all have access to the region's unique lifestyle offering.
- Leading Cape: Urban and rural areas are effectively managed.

With regards to the vision as set out by the Western Cape PSDF, the proposed development directly meets the vision in that it proposes to establish an educational institution / place of learning and innovation, with the intentions of providing an opportunity to attain good quality education to all members of society. Furthermore, should this development proposal be accepted, the vision of 'Working Cape' will be addressed as a variety of short and long-term employment opportunities would be created through the proposed development, both during the construction and operational phases.

The proposed development will also contribute to '*Connecting the Cape'* as the nature of the proposed development will not only attract people from all over George, but also all over the region, country and world, while simultaneously creating a unique area within which to work, live, learn and play.

The establishment of an education facility is also supported at a local level. The George Integrated Development identifies 5 Strategic Goal (SG). Linked to the SGs are a number of Departmental Objectives, of which the following support the proposed development:

- Identify an educational and research hub and to facilitate the continued growth of NMMU in George;
- Create and facilitate an enabling environment for economic development in George;
- Establish incubators, clusters and centres of excellence to contribute meaningfully to the demands of a growing economy. These centres can be linked to and benefit from the proposed university;
- Establish a Science Park. This can be linked to the proposed development of a university;
- Promote George as a sports tourism and business destination. The research from Stellenbosch has indicated that the University of Stellenbosch has contributed to establishing Stellenbosch as sports and business destination;

From a spatial perspective, the George SDF notes that the development of George should reinforce George city's regional service centre role through attracting higher order, high quality education and health facilities, regional government administration and commercial headquarters.

2.2. Desirability of the Site Location

The Portion of the Remainder of Erf 464, is located in the north-eastern regions of the town of George, which as a whole forms part of the Garden Route District (previously known as the Eden District). This town is located to the east of Wilderness, with a strong coastline forming the southern boundary of the town. Directly to the north

of the site is characterised by mountainous areas, which plays a key role in the location of the Garden Route Dam, which forms most of the northern boundary of the site.

Most of the areas to the west and to the south of the site have been developed, with residential land uses making up the majority of developments in these areas. Towards the east and the north of the site is vast areas of land that is being used for forestry.

The Town Planning Motivation Report (Aurecon, 2020) notes that the site is located within the urban edge and is largely surrounded by existing residential and agricultural land uses. Residential land uses presented within this development proposal have been strategically located in order to lessen the impact on surrounding residential land uses and to conform to the grain already in existence within this area of George. Therefore, the residential component of this development proposal will fit well with existing land use in the area and proposed within the parameters of the SDF.

In addition, the other surrounding land uses being agricultural, contributes to the aesthetic character envisioned for this university/research institute/academy and accompanying land uses (business, hotel, residential, waterfront etc.).

The existing surrounding land uses conform to the low noise level requirements for a university/research institute/academy. The land uses proposed on this site are also not intrusive on the surrounding land uses and several measures have been taken in the design to ensure that this remains the case.

2.2.1. Location Factors Favouring the Proposed Development

The core of the campus is located centrally in the eastern half of the site. This campus is strategically located on the flatter slopes on the site and is intended to be a key attraction to the site. Furthermore, the campus is also located away from current residential areas and in close proximity to the NMMU Saasveld campus.

A mix of Single Residential and Group Housing land uses are proposed on the western portion of the site. This is to ensure greater integration between the existing neighbourhood and the newly proposed land uses towards the north-west of the site. A variety of types of housing is planned that could cater for undergrad students, lecturers, visiting lecturers, post grad students through to single residential erven. The varied public uses, which takes full opportunity of the scenic nature of the site, will remain accessible to the community of George as well as the campus users. These public uses could include mountain biking, hiking, picnicking and canoeing on the dam.

With regard to the proposed recreation facilities, these have been strategically located within the development. Recreational spaces are located in order to ensure that these facilities do not cause a nuisance to the existing residential developments adjacent to the site and will simultaneously act as public spaces in off-peak times.

Environmentally sensitive areas have been taken into account and riparian areas have been maintained in the development proposal with selected buffer areas placed around these riparian zones.

The previously approved Hotel and Tourism Business facility also bear a strategic location, by harnessing the natural beauty of the site, thereby attracting investment. The Hotel area can be linked to the business area with a pedestrian bridge and this precinct could also include a Business School and possible tourism related training facilities. Finally, the proposed waterfront area is to act as a potential link between land and water where a variety of activities could take place from local trade to relaxation activities for visitors.

2.2.2. Ecological Integrity

Environmentally sensitive areas have been taken into account in the design of the development layout. Riparian areas have been maintained in the development proposal with selected buffer areas placed around these riparian zones. In addition, the presence of CBA's and other sensitive ecosystems have informed the placement of open areas in the development layout.

The proposed development is compatible with and supports the key principles and objectives contained in the relevant key land use planning and policy documents that pertain to the Western Cape and George area, including the Western Cape Provincial Spatial Development Framework (2014), George Local Municipality Integrated Development Plan 2017-2022 and the George Local Municipality Spatial Development Framework (2019). The site is currently registered as an erf within the urban development boundary (George MSDF 2019) but outside the present urban area; zoned as "Undetermined", thus the activity / development is currently not permitted according to the existing land use rights. However, an application to obtain the required land use rights is underway

The proposed site has therefore been identified as a desirable site location.

2.3. Human Needs & Resource Efficiency

2.3.1. Provision of Higher Education Facility

According to the Town Planning Motivation (Aurecon, 2019) one of the biggest considerations for the decision to develop a university/research institute/academy on this site, was the need for inclusivity and benefit to a large portion of the population. The proposed university/research institute/academy would be fully inclusive and would encourage the use of its services to all members of society.

This proposed development would enhance the social opportunities for all members of society and would generate social upliftment in a way that very few other land uses would. There are currently no other institutes of this nature in George, thus this proposed institution would create a unique opportunity from which all members of George and further abroad could benefit. Education would also create social upliftment in the long term by indirectly addressing any unemployment issues in George. Therefore, it is envisioned that this development proposal would hugely contribute to social upliftment in George, both in the short and long term.

Barbour (2019), in his case studies, identified a range of additional benefits associated with a university. These include demand side impacts and supply side impacts.

2.3.1.1. Demand side impacts

Universities have significant operating budgets which include compensation for faculty and staff members, research, the purchase of goods and services, capital spending, scholarships and employment benefits. The literature review found that the majority of the expenditure is in the form of wages and salaries. However, the impact of the direct spending is propagated through indirect and induced effects on the economy, which, for example, support employment in other local industries and contribute to the existence of a vibrant local economy.

Staff spending: Expenditure on staff wages and salaries comprises a significant portion of a university's expenditure. This not only has a direct effect, but if one can assume that the staff expenditure would have occurred out of town and now happens locally due to the existence of the university, as such, the spending creates additional indirect and induced effects.

Student spending: In general, universities attract many out-of-town students. This contributes to the overall

economic impact through spending on student housing, food, transportation and education.

Visitor spending: A common characteristic of universities worldwide is that the institutions attract visitors. Visitors could come to a university to attend academic conferences or workshops, present or attend guest lectures, partake or attend sporting and cultural events, or to simply visit friends and/or family studying at the university. These visitors also generate an additional economic impact through spending on food, accommodation, transportation and various other avenues. The quantum of visitor spending is probably enhanced when the institution is based in tourism friendly and attractive areas.

The presence of a university positively impacts local businesses. These businesses often employ a number of university students and alumni. Furthermore, the students attracted to the area by the university provide additional customers to these businesses.

2.3.1.2. Supply side impacts

In addition to the economic impact induced by increased expenditure, higher educational institutions affect future output through various supply-side factors. These factors include, but are not limited to, human capital formation, an increase in the region's technological base, the impact of university research, and the promotion of collaboration between universities and local businesses.

Human capital: Education, especially higher education, is an investment in human capital which increases future output and the lifetime earnings of graduates. Universities lead to a more educated and higher earning workforce within a region, leading to increased spending within a local economy. As such, universities and colleges have been singled out as the premier institutions for generating and maintaining a nation's professional labour force. The presence of higher education institutions in a region attracts further business activity.

Technological base: Another important impact that universities can have on regional economic development is the attraction of highly competitive companies. Universities play a catalytic role in driving innovation and increasing economic opportunity, allowing regions with universities to embrace innovation and remain globally competitive. This means that higher education institutions contribute to an area's technological base to the extent that companies locate to the region and receive inputs from the institution's research efforts and link academic research to the real world.

2.3.1.3. Additional Benefits

In addition to quantifiable contribution to economic growth in the local economy, universities also serve as significant sources of cultural, recreational and social enrichment. In this regard, increasingly, attention is being placed on the role of so-called anchor institutions in the local, urban environment and the impact these institutions have on the development of a town or region in general.

University sport facilities can attract external sporting teams and the public, which attracts additional expenditure in the area through the need for accommodation, food and services.

Arts, culture and heritage have various positive social and economic impacts on a region, both tangible and intangible. Arts, culture and heritage make a tangible contribution to economic growth in a region through various avenues (including visitor expenditure, job creation and skills development) while the intangible benefits are difficult to quantify. This is because most people do not value arts, culture and heritage based on its economic and social benefits, but rather by the benefit it adds to their personal lives.

2.3.1.4. Post-Covid Need

As we enter the Fourth Industrial Revolution we will need more space for students, not only for traditional careers but for the careers that the Fourth Industrial Revolution will bring. The COVID 19 pandemic has taught us that as much as the world changes it also stays the same. At the beginning of the pandemic there were many recommendations and ways of treating the disease which were radically changed as new information and understanding of the disease became evident.

As the world moves through this pandemic and will face the next one, the fundamentals that drive the economy and society don't change. At the beginning of the pandemic the "*work from home and study from home*" were seen by some as the solution to not only stopping the disease spreading but also the need for institutions of learning. We are now understanding both the upsides and downsides to the work and learn from home lifestyle. This includes such factors as the impact of students interacting with each other and access to the internet and computers and other learning tools. What works in first world situations does not always apply to third world situations.

The COVID 19 pandemic will not quell the need for more institutions of learning in South Africa. In the future, without further expansion of education facilities current and future generations will have to leave George so that they can attend educational facilities in other Cities simply because those courses are not offered in George.

2.3.2. Economic Stability

According to Aurecon 2021, the proposed development will support densification within the urban boundaries by introducing a variety of land uses on land that is currently vacant. Importantly, it is the nature of this proposed development that will dramatically enhance the economic growth of George. This development is intended to introduce a university/ research institute/academy into the town of George, which is currently a missing feature of this town. This development will thus increase the marketability of George as both a major tourist / coastal destination and an educational hub. It is the presence of a university/research institute/academy in this area that will attract visitors from various parts of the country and further abroad.

The above-mentioned immigration of people will not only uplift the tourism industry within George but will also increase the demand for other products and services within George, thus automatically positively influencing the local economy of George.

Although the university/research institute/academy is the key component of this proposed development, it is important to understand that the accompanying land uses will also influence the local economy and generate an income, not only for the general public, but also for the municipality. Firstly, the development of residential units will contribute towards addressing the housing demand in this area. In addition, rates and taxes accrued from these housing opportunities will generate income for the municipality. Another income stream for the municipality would be the sale of these portions of land to private developers for the purpose of providing residential opportunities on selected portions of the site. Secondly, the proposed business and hotel component of the development proposal will further promote tourism and contribute to the local economy. The business and hotel component will complement the proposed education component of this development and vice versa.

Investment in education, office space and retail facilities etc., would generate significant direct economic output from construction activity as well as economic outputs from the operational phase of this development. The increased job creation will automatically increase the economic growth of George. The proposed land uses have largely been determined based on the positive influence that these land uses would have on the economy.

The development will also facilitate the operations of business services, retail spending and education/training

which will have longer lasting impacts on the local community. In addition, the increase in human capital via higher levels of educational attainment will generate higher incomes in the region, both in the short and longer terms.

Barbour (2019) explains that universities are so-called stable employers because, unlike private companies, they are unlikely to close or relocate in difficult economic circumstances. This reduces the risk of economic volatility in a region.

This benefit extends beyond just the university's direct suppliers, through the entire supply-chain and local staff spending, fostering a greater degree of stability and confidence in the region.

2.3.3. Provision of public facilities and open spaces

The proposed development makes provision for the establishment of public open spaces, formal sports fields and a waterfront commercial development. These components will contribute to an improved quality of life for many local residents of the receiving communities.

The development proposes approximately **67ha of parks and natural areas** which can continue to be used by the George community for recreational activities. **The proposal aims to improve access for cyclists, trail runners, walkers and canoeists, fishermen, amongst others to the existing recreational areas around the dam.** This area has historically been used by the public as a recreational area and the proposal aims to enhance this aspect.

Many cyclists, runners and walkers utilise the main gravel road which leads to the dam wall as access to the trails situated on the eastern and northern side of the dam wall. George is fortunate to have such areas for recreation and many residents use these areas both on weekdays and weekends. There are also trails on the area to be developed as some of these trails are currently overgrown. The proposed development will further enhance the accessibility to these trails and nature areas by improving access and security.

There are a large number of open areas in George which need to be maintained by the City's parks and gardens Department on a weekly basis. The City's budget to maintain parks and gardens is not going to be able to cover the maintenance and construction of paths and trails on this property and therefore developing paths and trials in tandem with the development of the area is the only way a long-term sustainable system of paths and trails can be implemented.

Another way to ensure the use of the area for recreation is the development of the "waterfront precinct", which was approved some years ago. The aim of the waterfront is to have coffee shops, canoe hire and possibly a sports hall, amongst other facilities, to cater for the various sports enthusiasts. This area could then become the focal venue for future sporting events.

Currently, the majority of sporting activities at the dam take place on an ad-hoc basis. Ultimately, when the campuses, sports fields and waterfront is developed, this will not only serve as a central place for recreation events to be organised and held from, but will also serve to provide the students with the ability to obtain semi-professional guidance and instruction in their chosen sporting disciplines.

In order to ensure this is done in an inclusive manner and that the conditions as per the Environmental Authorisation (EA) are adhered to, the various sporting bodies are encouraged to become part of the Environmental Liaison Committee (ELC). This ELC would be invited to attend meetings during construction to help unpack the conditions of the EA so that the right structures are implemented at the right time and that appropriate monitoring takes place so that the Environmental Management Programme (EMPr) is adhered to.

By providing constructive input into the EIA process, the various sporting disciplines such as trail runners, road runners, mountain bikers, canoeists, fishermen etc, can add value to the process and ensure that their needs are encapsulated in the Environmental Reports and Environmental Authorisation.

Through the establishment of more formal paths and walkways which do not currently exist, the safety of the area will be improved. Local hiking, running, biking clubs and fishing clubs would be able to assist with monitoring the trails and feeding any issues back to the Municipality to address.

2.3.4. Non-Motorised Transport

Non-Motorised Transport (NMT) is a form of active transportation. Active transportation consists of human-powered forms of travel such as walking, cycling, rickshaws, skating/ roller-blading, shopping trolleys and manual wheelchairs.

The George Campus design focuses on pedestrian accessibility and mobility, providing green corridors linking all components of the development. The campus area is connected to the business area and the sport and student housing area with a Campus Walk. Additional walkways and pathways should also be planned to run throughout the development and to use the opportunities alongside the green belts to create strong connections to the various precincts of the development. The Main campus is in close proximity to both the Waterfront business area, the hotel area and the sport facilities. Other departments and/or other symbiotic academies are dotted in groups along the Campus Walk. The Hotel area can be linked to the business area with a pedestrian bridge and this precinct could also include a Business School and possible tourism related training facilities.

2.3.5. Safety, Health and Well-Being of the Surrounding Community

The proposed land uses are compatible with the surrounding existing land uses and therefore, no negative impacts on safety, health and well-being of the surrounding community is anticipated. On the contrary, the nature of the activities proposed in this development proposal would be of such nature that it would increase foot traffic in the area and thus contribute to the safety of the area through increased surveillance.

No excessive pollution would be generated on site and the nature of the proposed activities would not have any effects on the health of the surrounding community.

2.3.6. Construction Materials

As far as reasonably possible, products and materials will be sourced and manufactured in the vicinity of a development. This would reduce the energy embodied in transporting materials over long distances to the site, which in turn could lower development costs and reduce the overall carbon footprint of the development.

In addition, all new buildings, and extensions to existing buildings, need to comply with the energy efficiency regulations, as set out in SANS 10400 XA. In response to the introduction of SANS 10400-XA, the Department of Human Settlements introduced amendments to the '*Norms and Standards for the Construction of Stand Alone Residential Dwellings'* and '*Adjustment of the Housing Subsidy Quantum'*. The new standards were based on the requirements of the SANS 10400-XA, which require the addition of measures to improve the thermal performance of dwellings.

2.3.7. Resource Efficiency

In order to address water efficiency in the proposed development, all toilets, taps and showers will have water use reducing measures installed, which would include aerators to reduce water flow and cistern weights to interrupt flush flow.

In addition, the inclusion of renewable energy sources and green building principles as part of the design of the overall development will be investigated and actively encouraged by the Municipality. According to the Green Building in South Africa: Guide to Costs & Trends (2016), Green Building in South Africa is growing exponentially, and the green cost premium appears to be progressively diminishing over time as a result of advances in technology and experience. In 2016, the average green cost premium over and above the cost of non-green buildings was only 5,0 %.

According to the UK Green Building Council, there are 5 steps to achieving a Net Zero Carbon Building. These are summarised in the image below. These principles should be followed to assist with the reduction in resource use and carbon emissions of the proposed development, where possible.

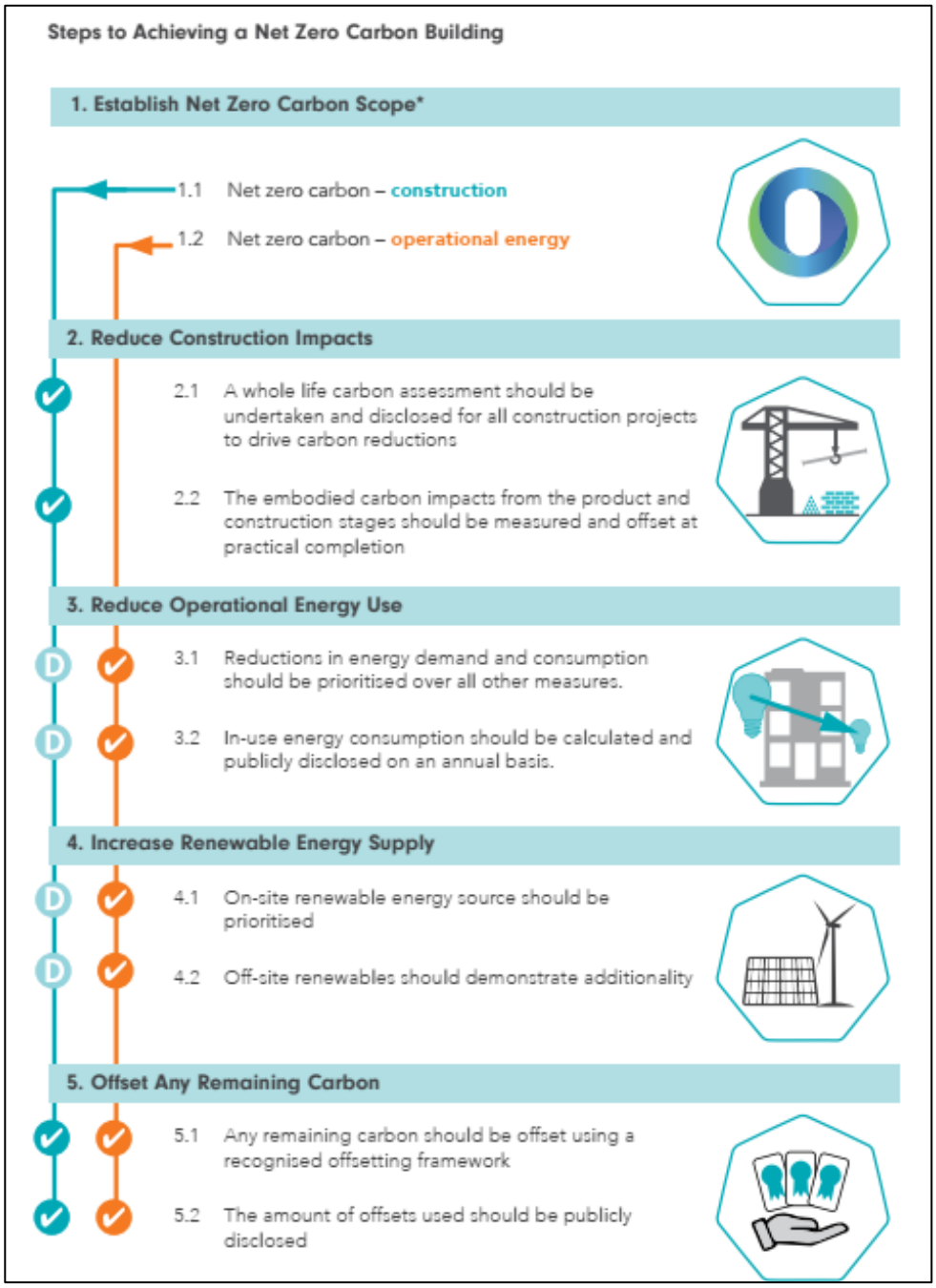


Figure 3: Steps to Achieving a Net Zero Carbon Building (Source: UK Green Building Council)

3. LEGISLATION AND POLICY PERTAINING TO THE APPLICATION

3.1. The Scoping / EIA Process

Due to the fact that a mixed use development of this size and nature is a "Listed" activity in the 2014 EIA Regulations promulgated in December 2014, and amended in 2017, it is required to undertake a Full Scoping and EIA Process. The Scoping and EIA Process is outlined in the figure below. The Competent Authority (Authority that will either grant or refuse the application) is the Provincial Department of Environmental Affairs & Development Planning, Western Cape (DEADP).

The EIA process is informed by the Environmental Impact Assessment (EIA) Regulations Government Notice No. R 326 (7th April 2017) and typically follows four main phases, namely, Pre-Application Public and Authority consultation Scoping Phase (*Optional*), an Application Phase, a Post-Application Scoping Phase and associated consultation and an Environmental Impact Assessment Phase and associated consultation as illustrated in the figure below. We are currently in the EIA phase Public & Authority Participation stage.

The objective of the "Scoping" Process, it to, through a consultative process:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

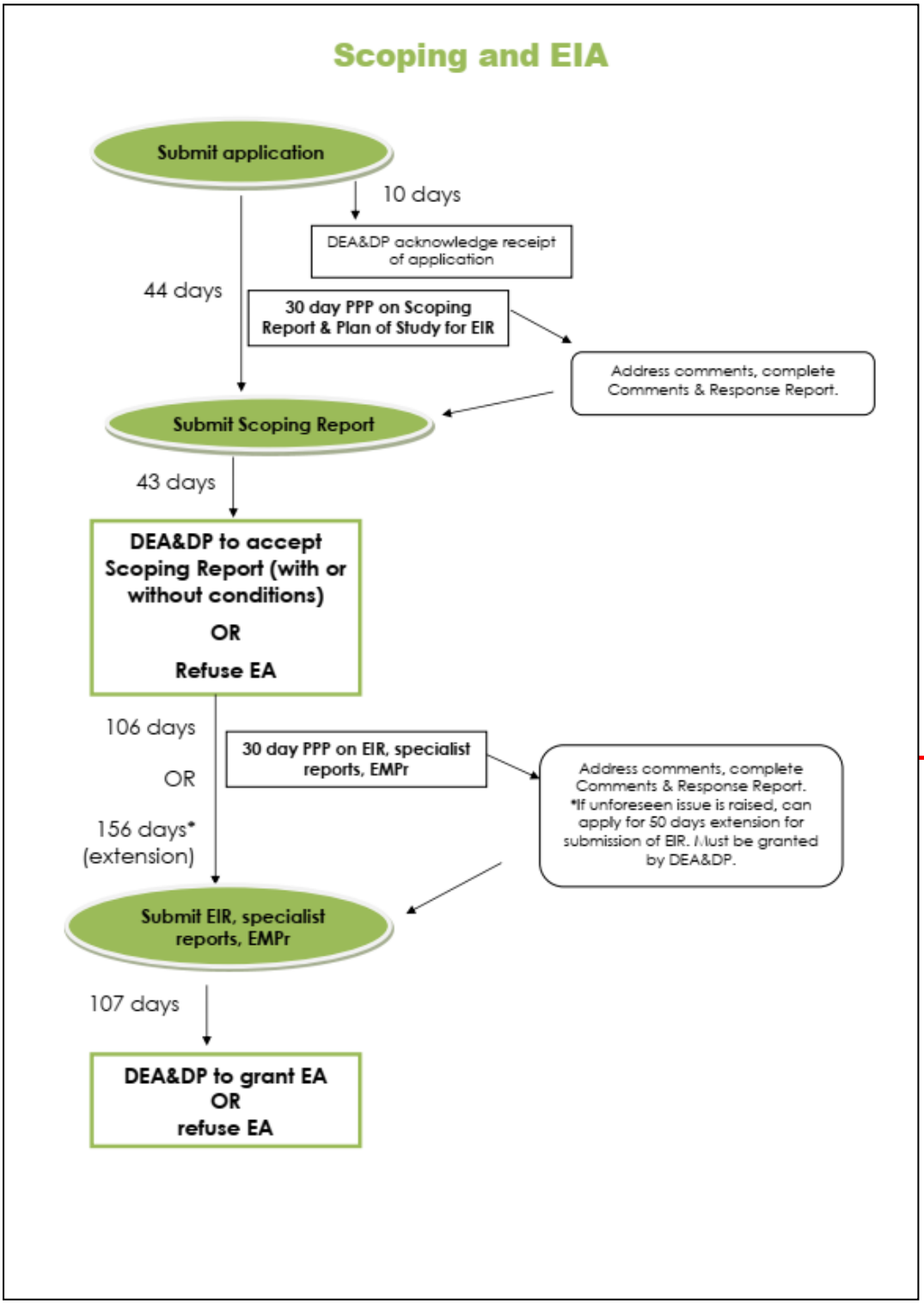


Figure 4: The Scoping / EIA Process

3.2. Summary of Regulations, Guidelines, Frameworks & Policies

The following Regulations (Acts) pertain to this development proposal and have been considered during the assessment process:

- The Constitution of South Africa (Act 108 of 1996);

- The National Environmental Management Act (NEMA), Act No 107 of 1998, as Amended;
- The Environmental Impact Assessment Regulations, December 2014, as amended;
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Waste Act (Act No. 59 of 2008);
- National Water Act (Act No. 36 of 1998);
- National Forest Act (Act No. 84 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- The National Veld and Forest Fire Act (Act No 101 of 1998)
- The National Health Act (No. 61 of 2003) and Health Act 63 of 1977;
- Conservation of Agricultural Resources Act – CARA (Act 43 of 1983);
- Subdivision of Agricultural Land Act (Act 70 of 1970);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Building Regulations and Building Standards Act (Act No 103 of 1977);
- Infrastructure Development Act (Act No.23 of 2014);
- Land Use Planning Ordinance (LUPO) Section 8 Scheme Regulations;
- Land Use Planning Act (LUPA) (Act No. 3 of 2014);
- Spatial Planning and Land Use Management Act (Act No 16 of 2013);
- National Roads Act (No. 93 OF 1996);
- Road Traffic Management Corporation Act (No. 20 OF 1999);
- The Municipal Systems Act (Act 32 of 2000);
- The Physical Planning Act (Act 125 of 1999); and
- Development Facilitation Act (Act 67 of 1995)

The following guidelines pertain to this development proposal and have been considered during the assessment process:

- Circular EADP 0028/2014: One Environmental Management System
- Guideline for Determining the Scope of Specialist Involvement in EIA Processes;
- Guideline for the Review of Specialist Input into the EIA Process;
- Guideline for Involving Biodiversity Specialists in EIA Processes;
- Guideline for Involving Heritage Specialists in EIA Processes;
- Guideline for Involving Visual and Aesthetic Specialists in EIA Processes;
- Guideline for Environmental Management Plans;
- Guideline on Public Participation;
- Guideline on Alternatives;
- Guideline on Need and Desirability;
- DEAT (2002) Scoping, Information Series 2 ((Integrated Environmental Management Information Series: Impact Significance); and
- DEA (2010), Guideline on Need and Desirability, Integrated Environmental Management Guideline Series 9.

National, Provincial & Municipal Development Planning Frameworks considered during the assessment process include:

- National Development Plan 2030 (2012);
- Western Cape Provincial Spatial Development Framework (PSDF) 2014;
- George Municipality Integrated Development Plan (IDP) 2017 - 2022;

- George Municipality Spatial Development Framework (SDF) (2019) (Draft);
- George Municipality Land Use Planning By-Law (2015); and
- George Integrated Zoning Scheme By-Law, 2017.

3.3. Summary Description of Most Significant Policy Documents

3.3.1. The Constitution of South Africa (Act No 108 Of 1996)

The Constitution of South Africa is the supreme law of the country of South Africa. It provides the legal foundation for the existence of the republic, sets out the rights and duties of its citizens, and defines the structure of the government.

Section 24 of The Constitution states the following:

Everyone has the right —

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that —
    - prevent pollution and ecological degradation;
    - promote conservation; and
    - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

3.3.2. The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014)

The National Environmental Management Act (NEMA; No. 107 of 1998, as amended) gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of an activity listed in Environmental Impact Assessment Regulations Listing Notices G.N. 324, 325, 326 & 327 published on the 7th April 2017.

Due to the fact that this development proposal is an activity listed in the EIA Regulations, a Full Scoping & EIA Process is required and the respective reports (Scoping and EIA) must be submitted to the Department of Environmental Affairs and Development Planning before they issue Status Homes Property Developers with an Environmental Authorisation (either approval or rejection of the development proposal).

3.3.3. National Environmental Management: Biodiversity (Act 10 of 2004)

This Act controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically make provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

3.3.4. Conservation of Agricultural Resources Act – CARA (Act 43 Of 1983)

CARA provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act also defines different categories of alien plants.

The purpose of this act is to ensure the long-term sustainable use and conservation of natural agricultural resources. The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) has the objective to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. It is the only legislation promoting the sustainable use of natural agricultural resources at farm level.

3.3.5. Subdivision of Agricultural Land (Act No. 70 of 1970)

The purpose of this Act is to control the subdivision and use of Agricultural Land. Subdivision is likely to be needed where various portions of farms need to be excised from the current farms and consolidated into a new property.

3.3.6. National Water Act (Act No 36 of 1998)

The Act provides the framework for the sustainable management of South Africa's water resources. It aims to protect, use, develop, conserve, manage and control water resources as a whole, promoting integrated water resource management that involves participation of all stakeholders. The Act declares the national government to be the public trustee of the nation's water. The Act is administered by the national Department of Water Affairs (DWA) via regional offices. The following section 21 "water uses" **require Water Use Authorisation (either in the form of a Water Use License (WULA) or a General Authorisation (GA) Water Use Registration:**

a) taking water from a water resource;
b) storing water;
c) impeding or diverting the flow of water in a watercourse;
d) engaging in a stream flow reduction activity contemplated in section 36;
e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
g) disposing of waste in a manner which may detrimentally impact on a water resource;
h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
i) altering the bed, banks, course or characteristics of a watercourse;
j) 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
k) using water for recreational purposes.

The proposed development requires a Water Use License (WUL) in terms of Chapter 4 and Section 21 (c) and (i) of the National Water Act No. 36 of 1998 and this must be secured prior to the commencement of construction.

The following water uses have been identified for the project:

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

These water uses will be associated with the following activities:

- The construction of infrastructure within the regulated area of the identified watercourses
- Waste water pipelines crossing rivers, adjacent to rivers, as well as within 500 m of the boundary of a wetland.
- The construction of road crossing on a watercourse
- Earthworks and storm water runoff and erosion/sediment during construction
- Storm water runoff management during operation

The findings of the Aquatic Risk Matrix Assessment undertaken show that due to development risk being calculated as 'Moderate' (after mitigation) the development cannot be authorised in terms of the GA (General Authorisation) for Section 21 (c) and (i) water use under this scenario and requires a full license application. Also, the GA for Section 21 c and i water use does not apply for "Any water use associated with the construction, installation or maintenance of any sewerage pipeline, pipelines carrying hazardous materials and to raw water (wastewater) and wastewater treatment works" and therefore a full WULA is required.

A water use license process is currently being undertaken through the online eWULAAs system and with the BGCMA.

3.3.7. National Forest Act (Act No 84 of 1998)

The purpose of this Act is to:

- promote the sustainable management and development of forests for the benefit of all;
- create the conditions necessary to restructure forestry in Sate forests;
- provide special measures for the protection of certain forests and trees;
- promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- promote community forestry;
- promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

This Act is governed by the National Department of Agriculture, Forestry and Fisheries who is a key commenting Authority in this EIA Process.

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

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). Heritage Western Cape (HWC) is the enforcing authority in the Western Cape, and is registered as a Stakeholder for this environmental process. In terms of Section 38 of the National Heritage Resources Act, HWC will comment on the development proposal.

Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process. The National Heritage Resources Act requires relevant heritage authorities to be notified regarding this proposed development, as the following activities are relevant that require **Heritage Approval**:

a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b) the construction of a bridge or similar structure exceeding 50 m in length;
c) any development or other activity which will change the character of a site—
   i. exceeding 5 000 m^2 in extent; or
   ii. involving three or more existing erven or subdivisions thereof; or
   iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
   iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
d) the re-zoning of a site exceeding 10 000 m^2 in extent;

A Notice of Intent to develop was submitted for the previous environmental authorisation process and a Record of Decision (RoD) from Heritage Western Cape (HWC), dated 13 August 2007, was issued which states that no further study is required, and the development may proceed with no conditions.

It is not envisioned that there would have been any further impact on Heritage aspects on the site based on the new design, however formal comment will be requested from HWC. A copy of this correspondence is included in **Appendix L4**.

3.3.9. The National Development Plan 2030 (2012)

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. *Chapter 9, Improving Education, Training and Innovation*, is relevant to and supports the establishment of the proposed education facility in George.

The NDP states that by 2030, South Africans should have access to education and training of the highest quality, leading to significantly improved learning outcomes. According to (Barbour, 20121) the current quality of education for most black children is poor. This denies many learners access to employment. It also reduces the earnings potential and career mobility of those who do get jobs – and limits the potential dynamism of South African businesses.

The NDP notes that by 2030, South Africa needs an education system with the following attributes:

- High-quality, universal early childhood education
- Quality school education, with globally competitive literacy and numeracy standards
- Further and higher education and training that enables people to fulfil their potential
- An ***expanding higher-education sector*** that can contribute to rising incomes, higher productivity and the shift to a more knowledge-intensive economy
- A wider system of innovation that links universities, science councils and other research and development role players with priority areas of the economy.

By 2030 the performance of South African learners in international standardised tests should be comparable to the performance of learners from countries at a similar level of development and with similar levels of access. Education should be compulsory up to Grade 12 or equivalent levels in vocational education and training. The education, training and innovation system should cater for different needs and produce highly skilled individuals. The graduates of South Africa's universities and colleges should have the skills and knowledge to meet the present and future needs of the economy and society.

The NDP notes that the single most important investment any country can make is in its people.

Education has intrinsic and instrumental value in creating societies that are better able to respond to the challenges of the 21st century. Lifelong learning, continuous professional development and knowledge production alongside innovation are central to building the capabilities of individuals and society as a whole.

The NDP identifies a number of goals, including eradicating poverty, reducing inequality, growing the economy by an average of 5.4%, and cutting the unemployment rate to 6% by 2030. Education, training and innovation are critical to the attainment of these goals.

Higher levels of education, skills, research and innovation capacity are also required for:

- The transition to a low carbon economy and meeting the greenhouse gas emission targets;
- Tackling health challenges;
- Developing new and utilising existing technologies;
- Taking advantage of the opportunities that arise from economic growth.

Building national capabilities requires quality early childhood development, schooling, college, university and adult education and training programmes. Research institutions and the national science and innovation system must be coordinated and collaborative.

The NDP highlights the importance and benefits of higher education, noting that higher education is the major driver of information and knowledge that contributes to economic development. Continuing education is necessary for meaningful participation in a modern economy where many jobs require some college or university education.

In addition, higher education is also important for good citizenship and for enriching and diversifying people's lives. Quality higher education needs excellence in science and technology, just as quality science and technology needs excellent higher education. The most important factor that determines quality is the qualifications of staff.

In terms of the post-school education, the current system consists of wide range of institutions with different objectives and meeting different needs, including:

- Further education and training colleges, which focus mainly on vocational education and training;
- Private providers at colleges and universities;
- Adult education institutions.

The NDP notes that these institutions can be developed to accommodate more learners. The goal is to have a post-school system that provides quality-learning opportunities to young people, adults who want to change careers or upgrade skills, people who have left school before completing their secondary education and unemployed people who wish to start a career.

In this regard South Africa needs a post-school system that provides a range of accessible options for younger and older people. The system should be capable of adapting to changes in technology, industry, population dynamics and global trends. Accelerating economic growth requires science, technology, vocational and technical skills, and they need to be produced quickly. To promote lifelong learning, post-school institutions should accept students who are academically less prepared and provide them with targeted support.

Universities

With specific reference to universities, in 2030, South Africa will have over 10 million university graduates with a minimum of a bachelor's degree. This takes into account the current number of graduates and the targets

proposed in this plan. This will be a 300 percent increase over a 30-year period (2001 – 2030). There will be roughly 400 000 new university graduates each year. In 2001, South Africa had 2.6 million graduates (Statistics South Africa) or one in every 17 people. **The aim of the NDP is that by 2030 one in six people will be a university graduate**. This is one of the strongest indicators of expanding access to university education.

However, of relevance to the proposed development, the NDP notes that the university sector is under considerable strain. Enrolments have almost doubled in 18 years yet the funding has not kept up, resulting in slow growth in the number of university lecturers, inadequate student accommodation, creaking university infrastructure and equipment shortages.

The NDP notes that universities have a key role in developing a nation and play three main functions in society:

- Firstly, they educate and train people with high level skills for the employment needs of the public and private sectors;
- Secondly, universities are the dominant producers of new knowledge, and they critique information and find new local and global applications for existing knowledge. South Africa needs knowledge that equips people for a changing society and economy;
- Thirdly, given the country's apartheid history, higher education provides opportunities for social mobility. It can strengthen equity, social justice and democracy. In today's knowledge society, higher education is increasingly important for opening up people's opportunities.

The NDP also highlights the importance and role of universities as centres of excellence and research and development.

Colleges

The NDP notes that the college sector needs to be expanded. The priority is to strengthen colleges, address quality teaching and learning, and improve performance. A critical indicator of performance is the throughput rate and the ability of college programmes to provide the skills South Africa needs.

Colleges are the backbone of technical vocational education and training. Their target group includes young people in the FET phase who chose the vocational pathway, adults who want to change careers or upgrade skills, and unemployed people who wish to start a career. The NDP notes that colleges should be strengthened to become institutions of choice for the training of artisans and producing other mid-level skills.

In order to improve colleges, the NDP identifies a number of objectives including:

- Improve the throughput rate to 75% by 2030. This would have a major impact on South Africa's skills profile.
- Support the development of specialised programmes in universities focusing on training college lecturers. Provide funding for universities to conduct research on the vocational education sector.
- Build the capacity of FET institutions to become the preferred institutions for vocational education and training. Learners should be able to choose the vocational pathway before completing Grade 12.
- Expand the geographical spread of FET institutions to ensure that learners who choose to pursue a vocational career have access to institutions that provide quality vocational education and training.
- Expand the college system with a focus on improving quality. Better quality will build confidence in the college sector and attract more learners.
- Build a strong relationship between the college sector and industry. This will improve the quality of training in colleges and ensure quick absorption of college graduates into jobs.

3.3.10. Provincial Spatial Development Framework (2014)

The overall policy objective of the PSDF is to secure environmentally sustainable development and the use of natural resources while promoting socio-economic development in the Western Cape Province.

Aim

The aim of the Western Cape PSDF is to:

- Give spatial expression to the national (i.e. NDP) and provincial (i.e. OneCape 2040) development agendas;
- Serve as basis for coordinating, integrating and aligning 'on the ground' delivery of national and provincial departmental programmes;
- Support municipalities to fulfil their Municipal Planning mandate in line with the national and provincial agendas; and
- Communicate government's spatial development intentions to the private sector and civil society.

Guiding Principles

The Western Cape's new PSDF is based on a number of spatial principles that is relevant to the proposed development, namely:

- Spatial justice – A socially just society is based on the principles of equality, solidarity and inclusion. While equal opportunity targets everyone in the community, social justice targets the marginalised and disadvantaged groups in society. Inclusionary settlements focus on the public realm rather than on private enclaves; support civic interaction and equitable access throughout the public environment; and make urban opportunities accessible to all – especially the poor. Past spatial and other development imbalances should be redressed through improved access to and use of land by disadvantaged communities.
- Sustainability and resilience – Land development should be spatially compact, resource-frugal, compatible with cultural and scenic landscapes, and should not involve the conversion of high potential agricultural land or compromising eco-systems. Resilience is about the capacity to withstand shocks and disturbances such as climate change or economic crises, and to use such events to catalyse renewal, novelty and innovation. The focus should be on creating complex, diverse and resilient spatial systems that are sustainable in all contexts.
- Spatial efficiency – Efficiency relates to the form of settlements and use of resources - compaction as opposed to sprawl; mixed-use as opposed to mono-functional land uses; and prioritisation of public transport over private car use. When a settlement is compact higher densities provide thresholds to support viable public transport, reduce overall energy use, and lower user costs as travel distances are shorter and cheaper.
- Accessibility – Improving access to services, facilities, employment, training and recreation, including improving the choice of safe and efficient transport modes (e.g. public transport, private vehicle, bicycle, walking and wheelchair) is essential to achieving the stated settlement transitions of the NDP and OneCape 2040. Accessibility is also defined by convenient and dignified access to private and public spaces for people with impaired mobility. Good and equitable access systems must prioritise the pedestrian, as well as provide routes for bikes, prams, wheelchairs and public transport. An accessible system will offer a choice of routes supporting these modes and safe connections between places and communities. Visual access implies direct sight lines or unfolding views, signs or other visual cues, and being able to see other people - all of which help in negotiating places.
- Quality and liveability – The quality of an environment directly contributes to its liveability. A good environment is one that is legible, diverse, varied and unique. The legibility of a place is contributed to by the existence of landmarks such as notable buildings and landscaping or well- defined public space as well as the legibility and structure of its street networks. Diverse environments provide a variety of opportunities,

experiences and choice. The more varied a place, the more valued because of the individual qualities that make it distinctive from other places. Liveable settlements feature a balance between individual and community, of logic and feeling, of order and random incident. In many cases, a town's public realm provides coherence and order while countless private ventures introduce variety and interest. One condition benefits from the other. The quality of public space can define the liveability of a place. Public spaces are the living rooms to settlements where people meet, play and relax. They need to be safe and attractive - features enabled by activity and surveillance.

The PSDF emphasizes the need for creating compact and inclusive communities. Infill development is seen as a key strategy. Policies in the PSDF that are of relevance to this development proposal include:

- Policy S3: Promote compact, mixed use and integrated settlements;
- Policy S5: Promote sustainable, integrated and inclusive housing;

It should be noted that losses of scenic and heritage rural character are taking place due to recent patterns of rural residential sprawl on the outskirts of urban centres associated with low-density property developments. A number of scenic landscapes of high significance are under threat and require strategies to ensure their long-term protection. Of relevance to the proposed development priority areas for proposed conservation and protection include:

- Rural landscapes of scenic and cultural significance situated on the major urban edges and under increasing development pressure.

Towards establishing a framework for addressing these challenges, the SDF lists a number of spatial implications that are relevant to design and development of the proposed development:

- In terms of landscape significance, the overall natural and cultural landscape, and the layered pattern of settlements in response to the natural landscape over time is worthy of protection;
- In terms of landscape integrity, retaining the essential character and intactness of wilderness, rural and urban areas in the face of fragmentation through unstructured urbanisation and commercial agriculture, must be achieved;
- In terms of landscape connectivity, continuity and interconnectedness of wilderness and agricultural landscapes must be retained, including ecological corridors and green linkages;
- In terms of landscape setting, maintain the role of the natural landscape as a 'container' within which settlements are embedded, the landscape providing the dominant setting or backdrop;
- In terms of the logic of landscape, recognise the intrinsic characteristics and suitability of the landscape and its influence on land use, settlement and movement patterns, in response to geology, topography, water, soil types and microclimate.

According to the Town Planning Report (Aurecon, 2020) the PSDF builds on OneCape 2040's vision of "a highly-skilled, innovation driven, resource efficient, connected, high opportunity and collaborative society". For each of these societal attributes aspired to OneCape 2040 identifies thematic 'big step' changes that need to take place. The PSDF envisages the spatial expression of these themes as follows:

- Educating Cape: Everyone has access to a good education, and the cities, towns and rural villages are places of innovation and learning.
- Working Cape: There are livelihood prospects available to urban and rural residents, and opportunities for them to find employment and develop enterprises in these markets.
- Green Cape: All households can access basic services that are delivered resource efficiently, residents use

land and finite resources prudently, and safeguard their ecosystems.

- Connecting Cape: Urban and rural communities are inclusive, integrated, connected and collaborate.
- Living Cape: Living and working environments are healthy, safe, enabling and accessible, and all have access to the region's unique lifestyle offering.
- Leading Cape: Urban and rural areas are effectively managed.

With regards to the vision as set out by the Western Cape PSDF, the proposed development directly meets the vision in that it proposes to establish an educational institution / place of learning and innovation, with the intentions of providing an opportunity to attain good quality education to all members of society. Furthermore, should this development proposal be accepted, the vision of 'working cape' will be addressed as a variety of short and long-term employment opportunities would be created through the proposed development, both during the construction and operational phases of the proposed development.

The proposed development will also contribute to 'Connecting the Cape' as the nature of the proposed development will not only attract people from all over George, but also all over the region, country and world, while simultaneously creating a unique area within which to work, live, learn and play. it is believed that the proposed development is fully aligned with the Western Cape PSDF and could potentially be a catalytic development through which to illustrate the spatial goals and vision of the Western Cape PSDF.

3.3.11. George Local Municipality Integrated Development Plan (IDP) 2017 - 2022

The George Municipality's vision is to be "***A city for a sustainable futur***e'. The IDP identifies 5 Strategic Goals that underpin the vision, namely:

- Strategic Goal 1: Develop and grow George
- Strategic Goal 2: Keep George clean, safe and green
- Strategic Goal 3: Deliver affordable quality services
- Strategic Goal 4: Participate in George – participative partnerships
- Strategic Goal 5: Ensure good governance and human capital in George

Strategic Goal (SG) 1 and 2 are most relevant to the proposed development.

Linked to the SGs are a number of Departmental Objectives, of which the following are relevant to the proposed development:

- Create and facilitate an enabling environment for economic development in George;
- Ensure the development of participatory, practically implementable economic development and business retention and expansion strategies;
- Ensure that industry support is focused on high-growth potential areas, with high job absorption ratios;
- Leverage construction industry potential through strategic housing related projects. In this regard the research from Stellenbosch has indicated that the provision of accommodation for the University of Stellenbosch has had a significant benefit for the construction sector;
- Establish incubators, clusters and centres of excellence to contribute meaningfully to the demands of a growing economy. These centres can be linked to and benefit from the proposed university;
- Establish a Science Park. This can be linked to the proposed development of a university;

- To promote George as a sports tourism and business destination. The research from Stellenbosch has indicated that the University of Stellenbosch has contributed to establishing Stellenbosch as sports and business destination;
- Identify an educational and research hub and to facilitate the continued growth of NMMU in George

3.3.12. George Local Municipality Spatial Development Framework (2019)

According to the report by Barbour (2019), the George Municipality is one of the seven municipalities that make up the Eden District Municipality. Economically, it is one of the higher performing areas in the Western Cape Province. In terms of the local economy, the George Municipality contributes 39.8% of the District's GDPR and is also the largest contributor to employment within the district (36%). The Western Cape Government's Growth Potential of Towns Study (WCG, 2014), also found that the George Municipality had very high growth potential in relation to towns within the Province. George is also served by three important national roads, the N2, N9 (R62) and N12, and the George regional airport, which serves the Southern Cape and Little Karoo.

The purpose of the George Municipal Spatial Development Framework (MSDF) as set out in the Spatial Planning and Land Use Management Act (2013) (SPLUMA) is to:

- Interpret and represent the spatial development vision of the municipality – informed by a long term spatial development vision statement and plan;
- Guide planning and development decisions across all sectors of government and specifically the municipality and provincial government in its spatial planning and land use management decisions;
- Contribute to a coherent, planned approach to spatial development across the spheres of government;
- Provide clear and accessible information to the public and private sector and provide direction for investment purposes;
- Include previously disadvantaged areas, rural areas, informal settlements, slums and landholdings of state owned enterprises and government agencies and address their inclusion and integration into the spatial, economic, social and environmental objectives of the relevant sphere;
- Address historical spatial imbalances in development;
- Identify the long term risks of particular spatial patterns of growth and development and the policies and strategies necessary to mitigate those risks;
- Provide direction for strategic developments, infrastructure investment, promote efficient, sustainable and planned investments by all sectors and indicate priority areas for investment in land development;
- Promote a rational and predictable land development environment to create trust and stimulate investment;
- Take cognisance of any environmental management instrument adopted by the relevant environmental management authority;
- Give effect to national legislation and policies on mineral resources and sustainable utilisation and protection of agricultural resources;
- Assist in integrating, coordinating, aligning and expressing development policies and plans emanating from the various sectors of the spheres of government as they apply within the municipal area; and
- Outline specific arrangements for prioritising, mobilising, sequencing and implementing public and private infrastructural and land development investment in the priority spatial structuring areas identified (SPLUMA, 2013).

As indicated above, the George IDP identifies 5 Strategic Goals of which Strategic Goal (SG) 1 and 2 are most relevant to the proposed development.

- Strategic Goal 1: Develop and grow George;
- Strategic Goal 2: Keep George clean, safe and green.

Strategic Goal 1: Develop and Grow George

The SDF lists an number of objectives linked to SG 1, of which the following are specifically relevant to the development of a proposed education facility:

- To identify an educational and research hub and to facilitate the continued growth of NMMU in George;
- To establish a Science Park;
- To create and facilitate an enabling environment for economic development in George;
- To establish incubators, clusters and centres of excellence to contribute meaningfully to the demands of a growing economy;
- To promote George as a sports tourism and business destination;

Strategic Goal 2: Safe, Clean and Green

The SDF lists an number of objectives linked to SG 2, of which the following are specifically relevant to the development of a proposed education facility:

- To ensure the development of a desirable and quality living environment that fosters the safety and welfare of the community concerned;
- Preserves the natural and cultural environment, and does not impact negatively on existing rights;
- To develop a focused strategy on greening the city.

The spatial vision for the George LM is to ***"Develop George as a resilient regional centre of excellence for inclusive, smart urban and rural prosperity".***

The SDF notes that, at the municipal scale, the key challenge is to manage the development and growth of the urban settlements to ensure ongoing sustainability and affordability whilst providing for the needs of the communities. As the main centre of the Municipality's population, services and employment, the George City Area needs to be restructured to integrate and enhance peripheral townships into the larger space economy of the city so that it functions more equitably and efficiently, with all of the opportunities that city living should bring.

The SDF identifies three spatial drivers that inform the development of the area, namely:

- The natural and rural environment which must be protected and managed to ensure it is able to function optimally as a basis for supporting and nourishing prosperous and resilient settlement and economic activity in George;
- The settlements and, within the city of George, the system of corridors and nodes which must be reinforced and developed in a managed way to function as a productive and efficient system;
- The regional accessibility network that links the settlements to one another within the Greater George Area, as well as to opportunities further afield. This includes the local accessibility network (motorised and non-motorised) connecting people and activities along corridors to nodes within the city of George.

The ease with which citizens of and visitors to George can access the opportunities, services and amenities it offers is a critical precondition for growth of the economy and development of its communities. In this regard the MSDF must promote an effective and efficient accessibility network that supports a productive interaction

between the urban (settlement and service centres) and rural environments, and within the settlements.

Of relevance to the proposed development, the movement network cannot only be a matter of mobility for cars and modes of public transport but the mobility network and the open space network, must also facilitate walkability and the use of non-motorised transport (NMT). The MSDF notes that there is a real opportunity to integrate the open space network and the non-motorised transport network in George to reinforce the utility and value of the "green fingers" (river corridors) penetrating through the urban areas and connecting communities.

The SDF identifies three spatial development strategies that are relevant to the proposed development and support the spatial planning approach to directing and managing development in the Greater George Area and the George city area, namely:

- Consolidate: Making what we have work better for our people;
- Strengthen: Build on George's foundations for growth and resilience;
- Smart Growth: Invest in catalysts for social and economic prosperity

The SDF identifies a number of policies associated with each development strategy that that have a bearing on the proposed development. The policy guidelines associated with the policies also inform the design and development of the proposed education facility.

4.3.1.1. Consolidate: Making what we have work better for our people

Policy A: *Prioritise infrastructure that invests in people and their socioeconomic mobility and resilience*
Policy A2: *Prioritise investment in the roll-out, maintenance and improvement of social infrastructure targeting poor households*
Policy Guidelines
The following policy guidelines are regarded as relevant to the design of the proposed development:

- Ensure human settlements planning and implementation is integrated with social facilities planning and public transport services. Facilities should always be within walking distance or within walking distance of public transport;
- Cluster public facilities and public space and locate within direct access to public transport routes;
- Higher order clusters of facilities should be located on the priority public transport corridors and regional accessibility networks, and planned so as to encourage complimentary private sector investment in the precinct, to support efficiencies and land use and social integration;
- Social facilities design should support the MSDF's intent to achieve the efficient use of land, densities that support public transport and walkability, as well as support the performance of the facilities precinct itself as an urban precinct, minimising collective and individual security and maintenance costs;
- Provide and maintain a high quality public realm and non-motorised public transport network in higher density residential areas linking to priority public transport corridors and nodes and clusters of social facilities within them, as safe places for community life where social and economic (formal and informal) activity is encouraged;
- Reinforce this investment with a high standard of area based urban management as an incentive for private investment and positive social interaction and activity;
- Fewer but better facilities are preferred if this enables the provision and maintenance of a high standard of social infrastructure and there is convenient and affordable access to these facilities.

Policy A3: *Enhance public transport and non-motorised transport connectivity within and between settlements regionally and within the George city area*

Policy Guidelines

The following policy guideline is regarded as relevant to the design of the proposed development:

- Support development which emphasises walkability and public transport as opposed to private car use.

Policy A4: *Provide and maintain a high quality, safe open space system through maintaining the integrity of existing spaces and actively seek to link viable open spaces into a continuous green web that, with the public transport corridors, forms the basis for the non-motorised transport network.*

Policy Guidelines

The following policy guidelines are regarded as relevant to the design of the proposed development:

- Use the natural assets; namely, the river corridors running through the George city area to "anchor" and structure the open space system;
- Seek opportunities to consolidate this system – linking the existing and proposed formal open spaces to it so as to expand the ecological functionality and recreational opportunities presented by a network of formal, informal and natural open spaces;
- Areas for active and passive recreational facilities (e.g. sports fields, jogging and cycling trails, etc.), should be integrated into the open space system and designed to be appealing to all, legible and safe;
- Seek opportunities for the open space system to contribute to the building of a safe pedestrian and non-motorised transport network;
- Seek opportunities to integrate the conservation of critical biodiversity areas into the open space system that allows public interaction in terms of land uses supported by the spatial planning categories;
- As far as possible, associate municipal parks with community facilities and schools to secure the safety and maintenance benefits of clustering.

Policy B: *Direct public and private fixed investment to existing settlements reinforcing their economic development potential. In this way, the impact of public and private investment is maximised, the majority of residents benefit, and the Municipality's natural and productive landscapes are protected*

Policy Guidelines

The following policy guideline is regarded as relevant to the design of the proposed development:

- Reinforce George city's regional service centre role through attracting higher order, ***high quality education*** and health facilities, regional government administration and commercial headquarters

Policy C: *Maintain a compact settlement form to achieve better efficiency in service delivery and resource use, and to facilitate inclusion and integration.*

Policy C1: *Within the George city area, direct public investment (public facilities, amenities and services), commercial activity and residential densification, in particular affordable residential opportunities, towards consolidating and reinforcing the principal public transport/ activity corridors and in particular the priority nodal centres identified in Map 14 (as civic and economic destination places).*

Policy Guidelines

The following policy guidelines are regarded as relevant to the design of the proposed development:

- Development in priority nodes should be promoted in accordance with the function of the node and its potential role to create a balance in the land uses within the node and a balance between origins and destinations in the public transport network; i.e. to promote demand for public transport throughout the day in different directions;
- The movement of public facilities or services or the location of new facilities or services should be planned in conjunction with the Integrated Public Transport Network to ensure the maintenance of public transport access.

Policy C2: *Restructure settlement patterns through infill development of vacant and underutilised land in the*

settlements in the George Municipal Area.

Policy Guidelines

The following policy guidelines are regarded as relevant to the design of the proposed development:

- Strategic land parcels identified in the George Restructuring Strategy should be prioritised for release for mixed use development that is inclusive of high density social or affordable rental housing and catalytic in nature from the perspective of regenerating the CBD for example;
- Actively support the reservation and protection of municipally owned land as an asset to assist in achieving social integration and living opportunities closer to existing facilities, employment opportunities, services and / or amenity sites.

As indicated in the figure below, the proposed site is located on municipal owned land.

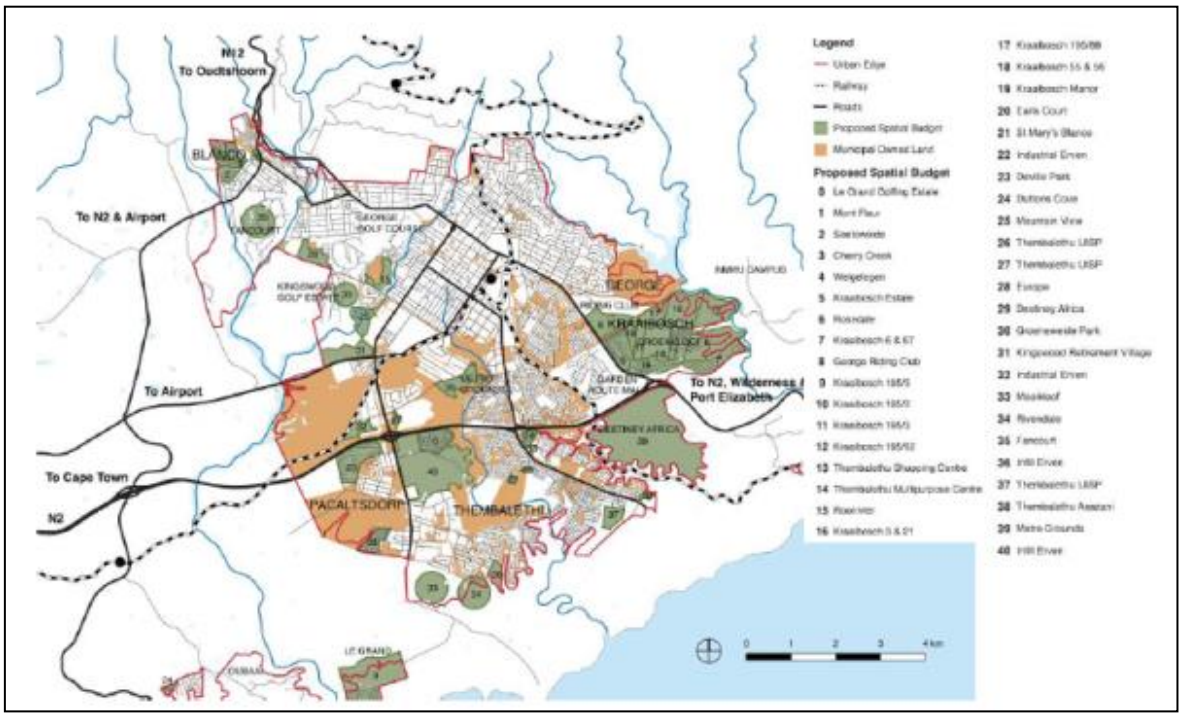


Figure 5: Location of municipal land (Source: Barbour 2019)

Policy C3: *Restructure settlement patterns through densification of the urban areas in the George city area in order to reduce land consumption, deliver services and facilities to households more cost effectively, and to establish the thresholds for viable public transport systems.*

Policy Guidelines

The following policy guidelines are regarded as relevant to the design of the proposed development:

- The focus of densification is not on residential use alone, a mix of land uses are required to sustainability restructure the urban areas of George;
- Support increased densities in the identified priority nodes and along the principal formal public transport activity corridors;
- Combine the repair and renewal of existing infrastructure in well located areas with enhanced capacity to accommodate densification.

4.3.1.2. Strengthen: Build on George's foundations for growth and resilience

The objective of this strategy is to strengthen George's natural and built assets that support life and livelihoods, offer the potential for further prosperity, as well as buffer the impacts of climate change to life and property.

Policy D: *Manage the use of land in the Municipal area in a manner which protects natural ecosystem functioning and values ecosystem services, respecting that these are assets that underpin the economy and settlement and their resilience.*

Policy D1: *Support and maintain the functionality of biodiversity areas*

Policy Guidelines

The following policy guideline has specific relevance to the proposed development:

- Land to the south of the Garden Route Dam, south of the watershed can be developed sensitively for urban development, the nature of which is to be determined but should promote integration and inclusivity. Any future development in this area will need to be dealt with sensitively to minimise environmental impact and hazard, ensure compatibility with the surrounding landscape and optimise public amenity. No urban development should be allowed to the north, east or west of the dam or, in other words, beyond the urban edge. This is a hard edge aimed at conservation of biodiversity.

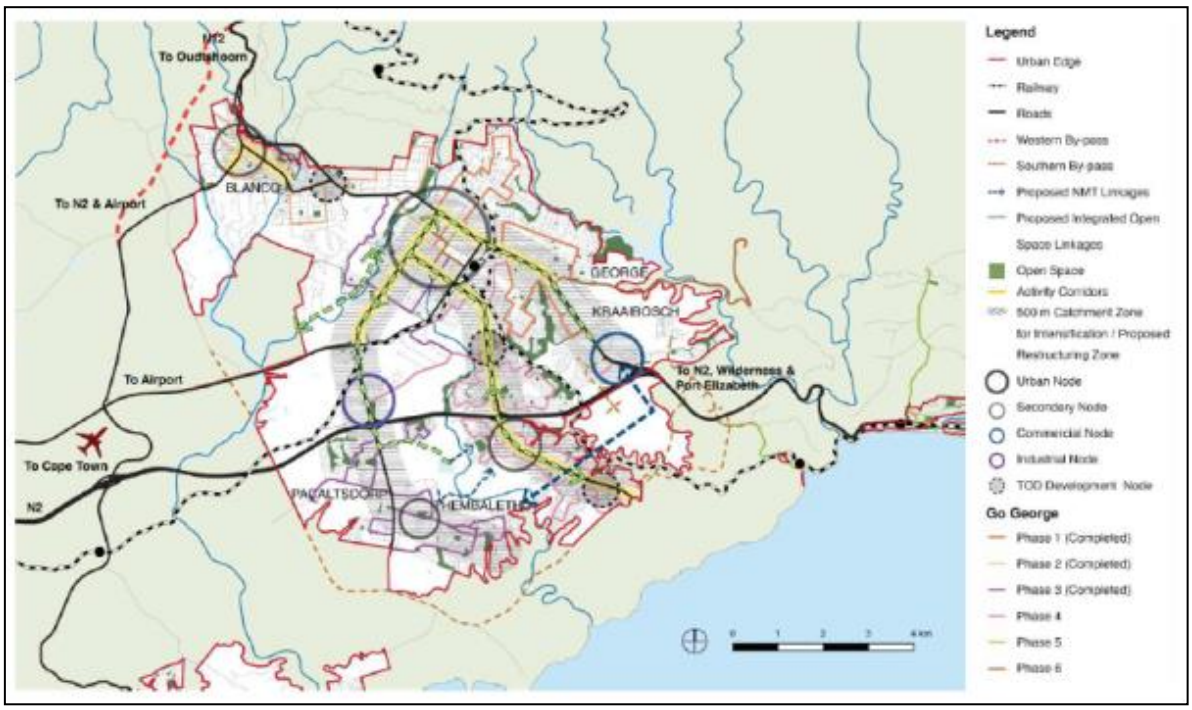


Figure 6: Location of site to south of Garden Route Dam (Source: Barbour 2019)

Policy D4: *Protect rivers and estuaries from pollution from neighbouring settlement*

Policy Guidelines

The following policy guideline is regarded as relevant to the design of the proposed development:

- The impact of settlement alongside rivers and estuaries must be monitored and managed to minimise pollution.

Policy D6: *Minimise the impact of developments on visual landscapes and corridors*

Policy Guidelines

The following policy guidelines are regarded as relevant to the design of the proposed development:

- The George Municipality's Landscape Characterisation Visual Resource Management Analysis (2009) determines visually sensitive areas in the George landscape and must be applied to manage visual impacts of development;
- Valuable view corridors, undeveloped ridge lines, cultural landscape assets and existing vistas should not be

compromised by any development proposal or cumulative impact of development proposals. The proportion of urban development up the slope of a prominent hill or mountain should not degrade its aesthetic / visual value;

- Employ the guidelines for managing visually sensitive landscapes set-out in the Garden Route Environmental Management Framework (EMF) and Visual Resource Management study.

Policy D7: *Manage the Municipal area in a manner that supports sustainable resource demand and use*
Policy Guidelines
The following policy guideline is regarded as relevant to the design of the proposed development:

- Protect publicly owned land that would facilitate public access to key destinations, in perpetuity and investigate the development of such destinations on this land. Of specific relevance George Dam is identified as a key destination.

Policy F: *Manage the growth of urban settlement in George to ensure the optimum and efficient use of existing infrastructure and resources and in turn, secure the Municipality's fiscal sustainability and resilience, while preventing further loss of natural and agricultural assets.*
Policy F1: *Maintain the urban edge as the development boundary where identified for settlements in the Greater George Area including the George City Area.*
Based in the information contained in the SDF, the proposed site is located within the George Urban Edge.
Policy F2: *Direct the long term growth of the George city area, when necessary, contiguous to the existing urban footprint in a manner that reinforces existing accessibility and infrastructure networks and minimises impact on natural landscapes and agricultural resources*.

4.3.1.3. Smart growth: Invest in the catalysts for social and economic prosperity

The objective of this strategy is to identify the policies that should guide generative and inclusive renewal and growth at the street scale. The focus is on identifying priority investment locations and clarifying how public and private investment should take shape so that settlements offer inclusive, accessible opportunities that support human capital growth. Transforming public spaces into safe, lively places of community and business life that improves attractiveness of George for investors and the whole community is at the heart of this strategy.

Policy G: *Support place-making interventions through building economic infrastructure and upgrading the public environment in priority investment locations to promote inclusivity and invite private sector response*
Policy Guidelines
The following policy guidelines are regarded as relevant to the design of the proposed development:

- In the assessment of land use and building applications and public sector developments, pursue compact and diverse neighbourhoods, offering places to live, work, recreate all within close proximity, served by streets scaled to people so that they are comfortable to walk;
- Promote an urban design approach for the provision of public space to ensure alignment with national and international best practice

Policy G1: *Promote walkability within the intensification zone and especially within the priority nodes*
Policy Guidelines
The following policy guidelines are regarded as relevant to the design of the proposed development:

- Get the land use and density right – create a reason to walk and enable walks to be reasonably short and achieve a range of needs;
- Make walking safe and comfortable. This is influenced by block size, sidewalk quality, a connected street network and visual interest;

- Ensure good edges to streets. Everyone seeks "prospect" and "refuge" – visually attractive and safe – people are "drawn to spaces that have good edges" (Speck, 2013);
- Make sure that streets include signs of humanity (active ground floors, cluster social facilities);
- Develop an integrated and connected street network, improving pedestrian connections allowing direct connections between places wherever possible.

Policy H: *Celebrate built heritage assets in a manner than contributes to renewal, urban quality and opportunity*
Policy Guidelines
The following policy guidelines are regarded as relevant to the design of the proposed development:

- Actively promote the use of the George Architectural and Urban Design Guidelines to ensure development which is appropriate to a "green theme", "garden city" and the public and natural context, of appropriate architectural form and proportion, and is sensitive to heritage;

Manage heritage places and landscapes in accordance with the findings and recommendations of the Municipality's Heritage Studies.

In conclusion, it becomes evident that this development proposal is not only in line with the George MSDF (2019) but has the potential to be hugely advantageous to the entire community and George as a whole. Through the adoption of inclusivity, integration, accessibility and sustainability, the proposed development will harness the vast potential of George to become a catalytic development through which to grow social, economic and environmental opportunities for all members of society.

3.3.13. George Municipality Integrated Zoning Scheme (2017) & George Municipality Land Use Planning By-Laws

In terms the George Integrated Zoning Scheme By-law, 2017, the site is currently zoned as "Undetermined Use Zone. In terms of the By-Law, the objective of *Undetermined Use Zones* is to enable the Municipality to defer a decision regarding a specific land use and development management provisions until the circumstances affecting the land unit have been properly investigated; or until the owner of the land makes an application for rezoning; or a zoning determination is made by the Municipality.

To allow for the proposed development as indicated in the above section, it is proposed that the site be rezoned from "Undetermined Use Zone" to "Sub-Divisional Area", as per subsection 20(2) of the Land Use Planning By-Law for George Municipality, 2015. Approval of this rezoning to subdivisional area would allow this Portion of the Remainder of Erf 464 to be viewed as a single entity – Portion A.

In order to make provision for the proposed development on this subdivisional area (Portion A), the intention is then to further subdivide the subdivisional area (Portion A) into 117 separate portions (refer to Appendix. C.1 for the proposed layout plan). The newly subdivided portions will then be zoned to the appropriate use zones to accommodate the campus and range of supporting land uses as proposed in the development proposal.

The use zones proposed in terms of the George Municipality Integrated Zoning Scheme By-Law (2017) includes the following:

- Community Zone I
- Business Zone I
- Single Residential Zone I
- General Residential Zone III
- General Residential Zone IV

- General Residential Zone VI
- Open Space Zone II
- Open Space Zone III
- Transport Zone II

3.4. Approvals Required Pre-Construction and Planning Phase

The table below summarises the various environmental and planning approvals required from the various Authorities, before the construction of the development may take place.

Table 5: Summary Pre-Construction Environmental & Planning Approvals Required

Competent Authority	In terms of Legislation	Type of Approval / Licence / Required
The Western Cape Department of Environmental Affairs and Development Planning (DEA & DP)	National Environmental Management Act (NEMA) and the 2014 EIA Regulations (April 2017)	**Environmental Authorisation** required in terms of the NEMA EIA Regulations (2014), as amended, for the activities listed below.
Department of Water Affairs & Sanitation (DWS)	The National Water Act (NWA)	A **Water Use Authorisation** is required for approval of the following water uses: 21c) – impeding or diverting the flow of water in a watercourse; 21i) - altering the bed, banks, course or characteristics of a watercourse; Application has been made on the eWULAAS system.
Heritage Western Cape (HWC)	National Heritage Resources Act (NHRA) – Section 38	Although **"Final Comment"** has been received from HWC for the development area, a revised comment will be requested.
George Local Municipality	Section 15 (2) (h) of the Municipal Planning Bylaw	The **rezoning and subdivision** of the consolidated portion into portions as shown on the layout plan needs to be approved by the Municipality.

The above approvals are informed by the Environmental Impact Assessment (EIA) process, an integrated process through which information regarding the proposed facility will be collected, organized, analysed and communicated to the relevant authorities for consideration.

3.5. Listed Activities Triggered in the NEMA EIA Regulations 2014, as amended

Table 6: Listed Activities in terms of the NEMA Environmental Impact Assessment Regulations (2014), as amended, that are proposed to be triggered and therefore require an application for Environmental Authorisation to be submitted to the DEA & DP.

LISTING NOTICE 1 (GN No. R327 of 7th April 2017): Basic Assessment		
Activity #	**Description of Activity as per GN No. R 327**	**Reason for Listing or NOT listing.**
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or	Stormwater pipe diameters are proposed to be 375mm. Although the site is within the Municipal urban edge, it may be considered outside

	(ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	of the urban area due to its undeveloped state. This activity **IS** therefore triggered.
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area	The proposed internal diameter of the sewer pipes is 160mm. This activity **IS NOT** therefore triggered.
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Although a new 66/11kV transformer will have to be installed at Glenwood Substation to cater for the future loads of the development, only 11kV bulk transmission infrastructure will be required. This activity **IS NOT** therefore triggered.
12	The development of— dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —	It is proposed that certain pipelines cross the watercourse on site. This activity **IS** therefore triggered.

	excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies	It is proposed that certain pipelines cross the watercourse on site. This would involve the movement of material in the watercourse. This activity **IS** therefore triggered.
24	The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road— (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or	Roads of varying widths are proposed for the development. Although the site is within the Municipal urban edge, it may be considered outside of the urban area due to its undeveloped state. This activity **IS** therefore triggered.
27	The clearance of an area of 1 hectare or more but	Although the study site (approximately

	less than 20 hectares of indigenous vegetation.	119Ha including the POS areas) is largely transformed, significant areas are still covered with indigenous vegetation. This activity **IS** therefore triggered.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforstation on or after 01 April 1998 and where such development: will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The portion of land on which the development is proposed has historically been used for afforestation. This activity **IS** therefore triggered.
LISTING NOTICE 3 (GN No. R324): Basic Assessment		
Activity #	Description of Activity as per GN No. R 324	Comment
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	Roads of varying widths are proposed for the development. Although the site is within the Municipal urban edge, it may be considered outside of the urban area due to its undeveloped state. This activity **IS** therefore triggered.
12	The clearance of an area of 300m^2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. (i) In Western Cape: 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; Within CBAs identified in bioregional plans; Within the littoral active zone or 100m inland from the high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or On land, where at the time of the coming into effect	The proposed development would require the clearance of an area mapped as CBA. This activity **IS** therefore triggered.

	of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning. On land designated for protection or conservation purposes in an EMF or a SDF adopted by the Minister.	
14	The development of— (i) dams or weirs, where the dam or weir, including Infrastructure and water surface area exceeds 10 Square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	It is proposed that certain pipelines cross the watercourse on site, which is identified as a CBA. This activity **IS** therefore triggered.
LISTING NOTICE 2 (GN No. R325): Scoping & Environmental Impact Reporting		
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- the undertaking of a linear activity; or maintenance purposes undertaken in accordance with a maintenance management plan.	Although the study site (approximately 119Ha) includes transformed areas, large areas of the site are still covered with indigenous vegetation. This activity **IS** therefore triggered.

Therefore, in summary, the following activities will be applied for:

- **Listing Notice 1: Activity No: 9, 10, 11, 12, 16 and 28;**
- **Listing Notice 2: Activity No 15; and**
- **Listing Notice 3: Activity No: 4 and 12.**

4. DETAILED DESCRIPTION OF THE PROPOSED PROJECT

4.1. Site Location and Description of Property

4.1.1. Summary Table Site and Farm Details

Please refer to the table below which is a summary of the site details associated with this proposed development and associated services (water and sewage) infrastructure.

Table 7: Summary Table: Site Details

Province	Western Cape
District Municipality	Eden District Municipality
Local Municipality	George Local Municipality
Ward number(s)	Ward No 18
Nearest town(s)	George
Portion name(s) and numbers	Remainder of Erf 464
List of Properties, Ownership & Extent of each Property Associated with Proposed Affordable Housing Development	

PROPERTY	OWNERSHIP	EXTENT
Remainder of Erf 464	George Municipality	*The total extent of the Remainder of Erf 464 George is not available, as it includes surrounding road reserves.*

Extent of Site (Development Footprint / Disturbed Area)	The portion of the erf that will be subdivided and rezoned as part of this application measures approximately 118.5 hectares in extent.
SG Code	C02700020000046400000
Physical Address	Madiba Drive, George, Western Cape
Co-ordinates of the site:	33°57'53.63"S 22°30'12.58"E

4.1.2. Location of Proposed Development

The site is situated in the North-Eastern part of George, bordering the Southernmost boundary of the Garden Route Dam. The site is bordered by a higher order road to the South, namely Madiba Drive that leads to the NMMU Saasveld Campus. The neighbourhoods of Eden George and Loerie Park are situated directly to the West of the site. The Glenwood Agricultural Holdings are located south of Madiba Drive. The area is characterised by a mountainous area to the north, with residential uses to the West and South of the site. The site is currently vacant, with various gravel roads on the site being utilised for recreational activities.

The property is situated approximately 2km north from the N2 highway, with access to the site currently being provided through the N9 (Knysna Road) linking in with Madiba Drive. The site can also currently be accessed via Stander Road to the West of the site.

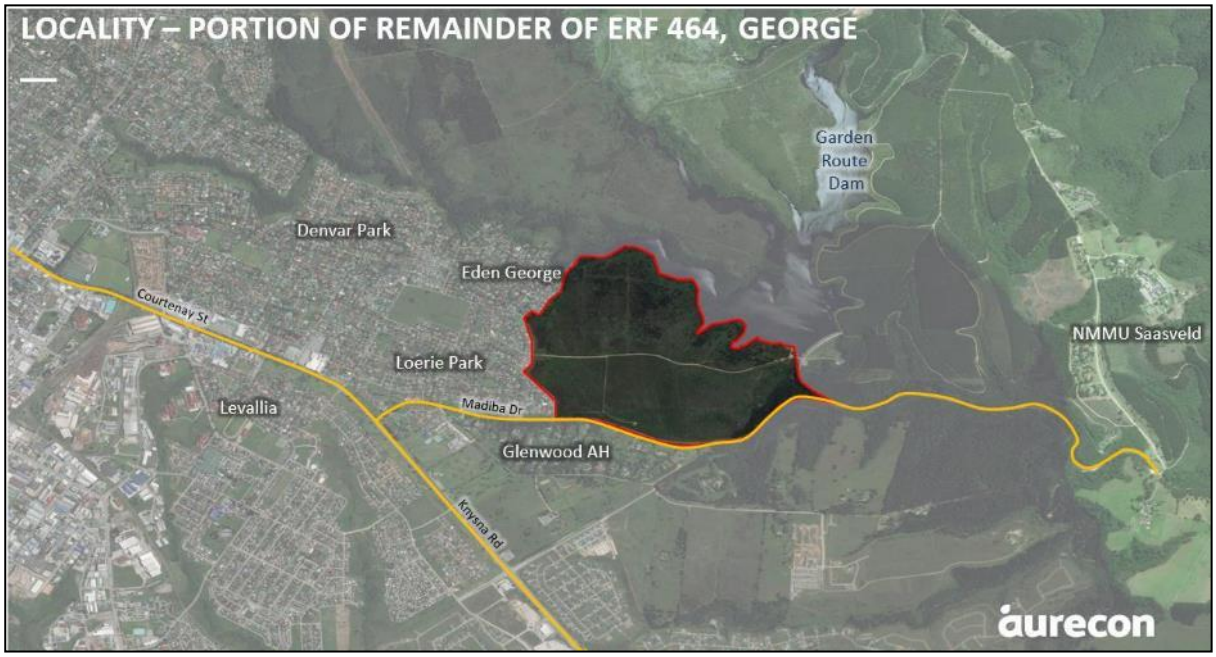


Figure 7: Locality map of Portion of Remainer of Erf 464, George (Source: Aurecon, 2019)

4.1.2.1. Surrounding Land Use

The area to the west of the property is a collection of neighbourhoods (Loerie Park, Eden George and Denver Park). The main land use in this area is Single Residential Zone I with a few selected developments being zoned as General Residential Zone II, located further to the east. Found in the neighbourhood is a variety of strategically placed open spaces / green spaces for recreational activities. These spaces are zoned Open Space Zone I. The area to the south of the property is zoned Agricultural Zone II. Although the zoning is Agriculture Zone II, the main land use is residential in this area. The area is a conglomeration of small holdings, which is permitted under Agricultural Zone II zoning. Further to the south, a golf driving range and a horse riding club is located on municipal land. The zoning for these sites is Open Space Zone II.

The area to the east of the property consists of large scale agricultural practices. The area directly to the east of the property is thus zoned Agricultural Zone I. The area to the north of the property consists of the Garden Route Dam and further agricultural practices. A small buffer area around the Garden Route Dam (a major water resource), forms part of the Katrivier Local Nature Reserve and is thus zoned as Open Space Zone IV. The agricultural areas to the north of the Garden Route Dam is also zoned as Agricultural Zone I.

In general, the area surrounding the site is characterized by a combination of residential land uses to the south and west, with large scale agricultural practices taking place to the east and north of the site. The development proposal presented in this application has taken these land uses into consideration and these considerations are reflected in this development proposal. See figure 6 below for a map illustrating the surrounding land uses around the site.

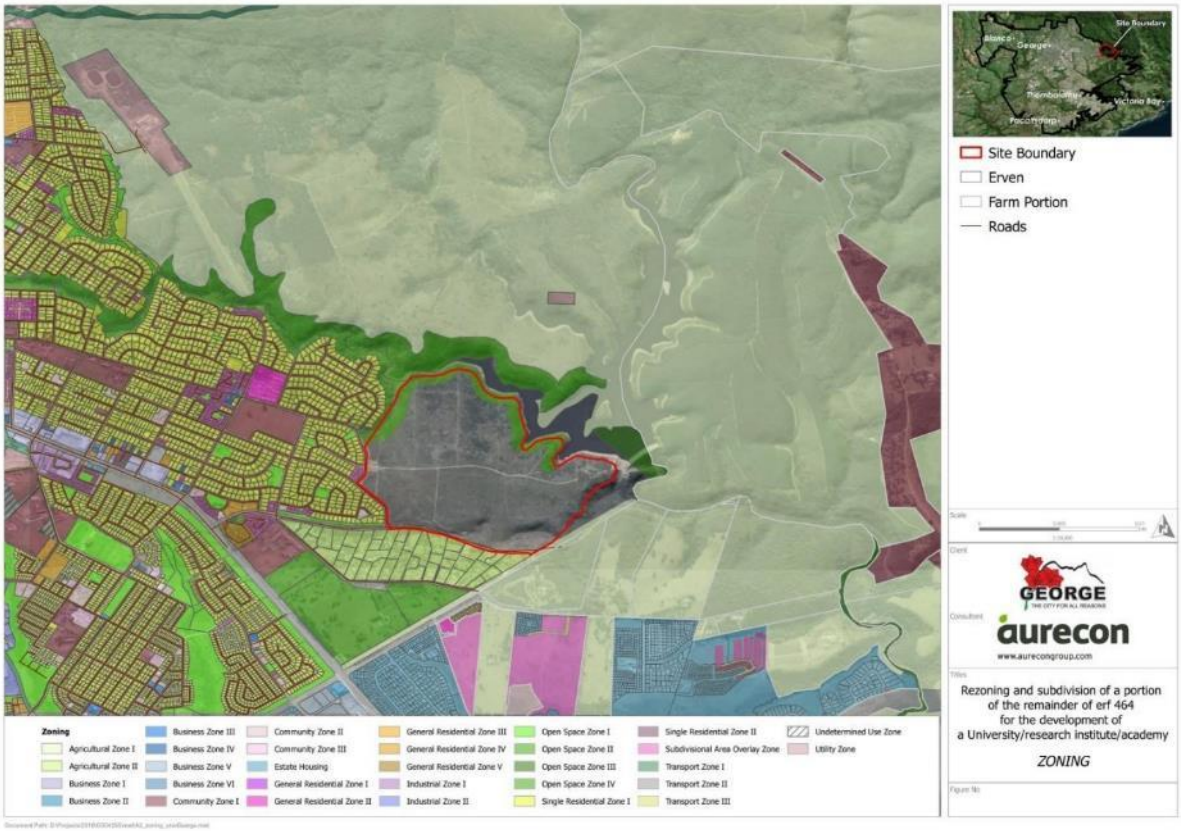


Figure 8: Zoning Map illustrating the surrounding land uses (Source: Zutari 2020)

4.2. Detailed Description of the Scope of the Proposed Activity

4.2.1. Description of Proposed Development

It is proposed to construct a tertiary education campus, with associated residential units and open spaces. The Public Open Spaces account for > 57% of the development proposal. The following is proposed to be developed as per the **Site Layout Plans** shown in **Appendix C** and in the **figures** below::

Table 8: Size and number of each respective aspect proposed

Development Proposed	No.	Size (ha)	%
Community Zone 1: Campus – University / Research Institute / Academy	8	13.66	12%
Business Zone 1: Waterfront Commercial Development	1	4.66	4%
General Residential Zone 6: Hotel	1	1.55	1
General Residential Zone 2: Medium Density Residential / Group Housing	3	5.47	5%
General Residential Zone 4: Apartments / Flats / Student Housing	4	4.84	4%
Single Residential Zone 1: Free Standing Dwelling Houses	91	5.76	5%
Open Space Zone 2: Recreation Spaces / Sports Fields	3	7.57	6%
Open Space Zone 3: Parks / Natural Assets / Preservation Areas	5	67.39	57%
Transport Zone 2: Roads	1	7.60	6%
TOTAL DEVELOPMENT FOOTPRINT		118.5	100%

* These numbers are approximate and may change slightly in the detailed design phase

Please refer to the Site Layout Plan in **Appendix C1**.

4.2.1.1. Campus – University / Research Institute / Academy

The key component of this development proposal is the proposed campus. The basis of this development proposal is the provision of educational spaces and facilities, which is collectively referred to as the campus. This development proposal thus places strong emphasis on the clustering of a variety of buildings, which will vary slightly in use.

The core of the campus is located centrally in the eastern half of the site. This campus is strategically located on the flatter slopes on the site and is intended to be a key attraction to the site. The design has thus made provision for selected prominent buildings towards the southern parts of the site, so that these selected buildings would be visible from Madiba Drive. This emphasis on visibility does however clash with the Visual Impact Assessment findings.

Figure 9: Vision for the Proposed Campus (Source: Linc Architecture / Urban Design)

Findings from socio-economic studies indicate that a university/research institute/academy would become a regional attraction and would greatly contribute to the growth of George. It also states that educational institutions are, in a sense, recession proof, as people still need to be taught no matter the state of the economy. This is very important in country like South Africa where economic growth and job creation remain a huge challenge.

Due to the nature of such institutions, this development proposal illustrates a focused cluster of various buildings in order to accommodate various institutions on the site. The diversity of institutions will be a crucial part of the creation of a mixed-use, vibrant, inclusive, sustainable and technologically advanced educational precinct in George. The proposed placement of these buildings also eliminates the possibility of the creation of exclusive spaces and further encourages foot traffic through these spaces through the inclusion of NMT infrastructure.

Due to the envisioned diversity of these educational institutions, an expansion of the core campus is proposed towards the north-west of the main campus. This expansion continues the inclusive, vibrant and sustainable

nature of the main campus by also emphasising pedestrian movement and by harnessing and maintaining the presence of natural vegetation and green corridors which will allow the open spaces to be managed better.

Figure 10: Example of campus (Source: Zurati 2020)

The development proposal illustrates the continued fine-grained nature of the buildings in order to ensure that all activities on this site is visually similar, with urban design practices guiding the finer detail within this proposal.

It should be noted that the Municipality would be preparing the land and securing development rights through the town planning and environmental authorisation processes. After the development rights are secured, the Municipality will follow a process endorsed in terms of the provisions of the Municipal Finance Management Act and Municipal Asset Transfer Regulations to call for proposals from suitable developers and partners to facilitate the development.

4.2.1.2. Residential

The residential land uses are seen to be first and foremost to support the campus environment and could also evolve and grow into various products that can be used for students during term and holidaymakers during the holidays.

A variety of types of housing is planned that could cater for undergrad students, lecturers, visiting lecturers, and post grad students through to single residential erven. The varied public uses, which takes full opportunity of the scenic nature of the site, are accessible to the community of George as well as the campus users.

A mix of Single Residential and Group Housing land uses are proposed towards the western side of the site. This is to ensure greater integration between the existing neighbourhood and the newly proposed land uses towards the west of the site.

There is currently existing demand for a range of housing opportunities in this area, together with predicted increase in demand due to the proposed development. It is estimated that this provision of residential space on the site will also absorb the demand for on-site housing by future employees, post-graduate students and other users of this space. It is envisioned that these residential spaces would be based on the principles of inclusivity, integration, choice, variety and sustainability. These residential opportunities would also generate a substantial income for the municipality, through rates and taxes accrued from such residential units.

Another obvious residential component is the inclusion of spaces for on-site student housing. Student housing is proposed in clusters on the eastern portion of the site, and in dispersed locations around the extended campus. These student housing opportunities are strategically designed in order to provide a range of housing options to ensure affordability and choice.

The images below illustrate examples of what the layouts for the proposed student housing accommodation being planned for on the campus could possibly look like and how it will be integrated with the university uses.

Figure 11: Examples of Student Housing Apartment Blocks (Note: Actual designs of buildings will be conducted by Architects and will differ from the examples provided) (Source: Zutari 2020)

4.2.1.3. Natural Assets and Preservation Areas & Recreational Spaces

As per the findings of the various environmental studies undertaken on the site, this development proposal places strong emphasis on the preservation and enhancement of natural assets present on the site. This development proposal has strategically harnessed the high-quality vegetation in order to allow these natural systems to flourish and contribute to the sustainability of this proposed development. As illustrated in this development proposal, riparian areas are located along the southern boundary of the site. The riparian areas have been maintained in the development proposal and selected buffer areas have been placed around these riparian zones. In order for the natural environment to maintain its functionality, this development proposal further makes use of green belts throughout the site and at strategic locations these green belts are used as buffers and beautification tools.

Understanding the importance of the functions of the natural resources on this site played an integral role in the layout of the proposed residential, educational, commercial and public spaces. The extensive natural features on the site forms a key component of the overall design of the proposed development as illustrated in the image below.

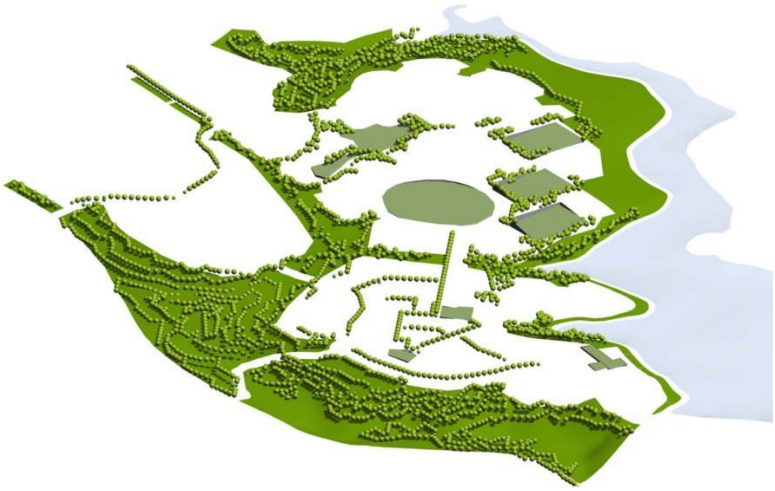


Figure 12: Figure depicting the Natural Features on the site (Source: Linc Architecture / Urban Design)

The inclusion of adequate recreational spaces on the site is also an important aspect of the development proposal. In order to conform to a variety of best practice guidelines and regulations, this development proposal includes several sports fields in key locations around the site. Most notable is a campus sports oval, large enough for a cricket field or athletics track, which would provide a good-quality space in which to host various events for the benefit of the entire community.

These facilities could be shared by the various institutions on the site and will be open to public use at dedicated times. Additional sports fields (international standard rugby / soccer fields) are located towards the northern boundary of the site in order to make use of the aesthetic beauty of the site. These recreational spaces are also strategically located in order to ensure that these facilities do not cause a nuisance to the existing residential developments adjacent to the site. These spaces will simultaneously act as public spaces in off-peak times.

Figure 13: Artist's impression of campus layout with sport oval (*Note: the residential component has since been reduced*)

The natural beauty of the site can further be enjoyed by the public through the inclusion of picnic areas along the water's edge as well as exploring the natural features of the surroundings such as the picturesque Garden Route Dam and Katrivier Nature Reserve.

Figure 14: Proposed Recreational Spaces & Natural Features of the Site

The proposal also aims to improve access for cyclists, trail runners, walkers and canoeists, fishermen, amongst others to the existing recreational areas around the dam. This area has historically been used by the public as a recreational area and the proposal aims to enhance this aspect. As such, an Open Space of approximately 67ha is proposed around the development area to be utilised for these uses. Many cyclists, runners and walkers utilise the main gravel road which leads to the dam wall as access to the trails situated on the eastern and northern side of the dam wall. George is fortunate to have such areas for recreation and many residents use these areas both on weekdays and weekends. There are also trails on the area to be developed but some of these trails become overgrown and need to be constantly maintained. There are a large number of open areas in George which need to be maintained by the City's parks and gardens Department on a weekly basis. The City's budget to maintain parks and gardens is not going to be able to cover the maintenance and construction of paths and trails on this property and therefore developing paths and trials in tandem with the development of the area is the only way a long-term sustainable system of paths and trails can be implemented.

Another way to ensure the use of the area for recreation is the development of the "waterfront precinct", which was approved some years ago. The aim of the waterfront is to have coffee shops, canoe hire and possibly a sports hall, amongst other facilities, to cater for the various sports enthusiasts. This area could then become the focal venue for future sporting events.

Currently, the majority of sporting activities at the dam take place on an ad-hoc basis. Ultimately, when the campuses, sports fields and waterfront is developed, this will not only serve as a central place for recreation events to be organised and held from but will also serve to provide the students with the ability to obtain semi-professional guidance and instruction in their chosen sporting disciplines.

In order to ensure this is done in an inclusive manner and that the conditions as per the Environmental Authorisation (EA) are adhered to, the various sporting bodies are encouraged to become part of the

Environmental Liaison Committee (ELC). This ELC would be invited to attend meetings during construction to help unpack the conditions of the EA so that the right structures are implemented at the right time and that appropriate monitoring takes place so that the Environmental Management Plan (EMP) is adhered to. By providing constructive input into the EIA process, the various sporting disciplines such as trail runners, road runners, mountain bikers, canoeists, fishermen etc, can add value to the process and ensure that their needs are encapsulated in the Environmental Reports and Environmental Authorisation.

Through the establishment of more formal paths and walkways which do not currently exist, the safety of the area will be improved. Local hiking, running, biking clubs and fishing clubs would be able to assist with monitoring the trails and feeding any issues back to the Municipality to address.

4.2.1.4. Hotel and Tourism Business Development

As previously approved by DEA&DP and the Minister of Local Government, this development proposal retains the idea of the construction of a hotel and tourism business development on a portion of the site (north-eastern portion of the site). It is felt that the inclusion of these uses has been well argued in previous applications and that the potential benefits which can be extracted from these uses can now be further enhanced through the inclusion of the proposed additional land uses.

It is envisioned that the inclusion of hotel and business facilities will attract a variety of users and will become an important role player in stimulating the local economy. The inclusion of hotel and business facilities would act as a major attraction use which will not only attract the wider community, but which will also ensure that the site is utilised at all times of the year. In addition, these facilities will greatly encourage the integration of various income levels and will provide pedestrian activity which would in turn support other uses on the site. A commercial sector will link the hotel area and the waterfront area to create a hub for students and citizens alike.

The strategic location of these proposed facilities would extract the natural beauty which is harnessed on this site and thus has the potential to attract investment into surrounding land uses.

The Hotel area can be linked to the business area with a pedestrian bridge and this precinct could also include a Business School and possible tourism related training facilities.

Adjacent to the above-mentioned hotel and business school is a proposed waterfront commercial area. This area has been strategically placed to capitalise on the potential of the integration between land and water. Due to the popularity of this portion of the site, the inclusion of commercial space ensures that public access and usability is retained on this site. This commercial area would accommodate formal trade and retail activities which would attract the general public and be a retail space that will serve the campus. The strategic placement of these commercial uses also ensures that users filter through the overall site, thus further activating the rest of the site. In addition, the nature of this space will contribute greatly to safety through surveillance and activity spaces. This commercial space is also envisioned to provide local entrepreneurs with viable spaces within which to apply their trade.

This waterfront commercial area does however not only focus on formalised commercial activity, but also includes the provision of ample public spaces/open spaces in an attempt to retain the existing interest in the use of this space for recreational activities. The vibrancy created through the integration of public/open spaces and commercial activities would enhance the social, economic and environmental uses of this site and will thus ensure further inclusivity of all members of society.

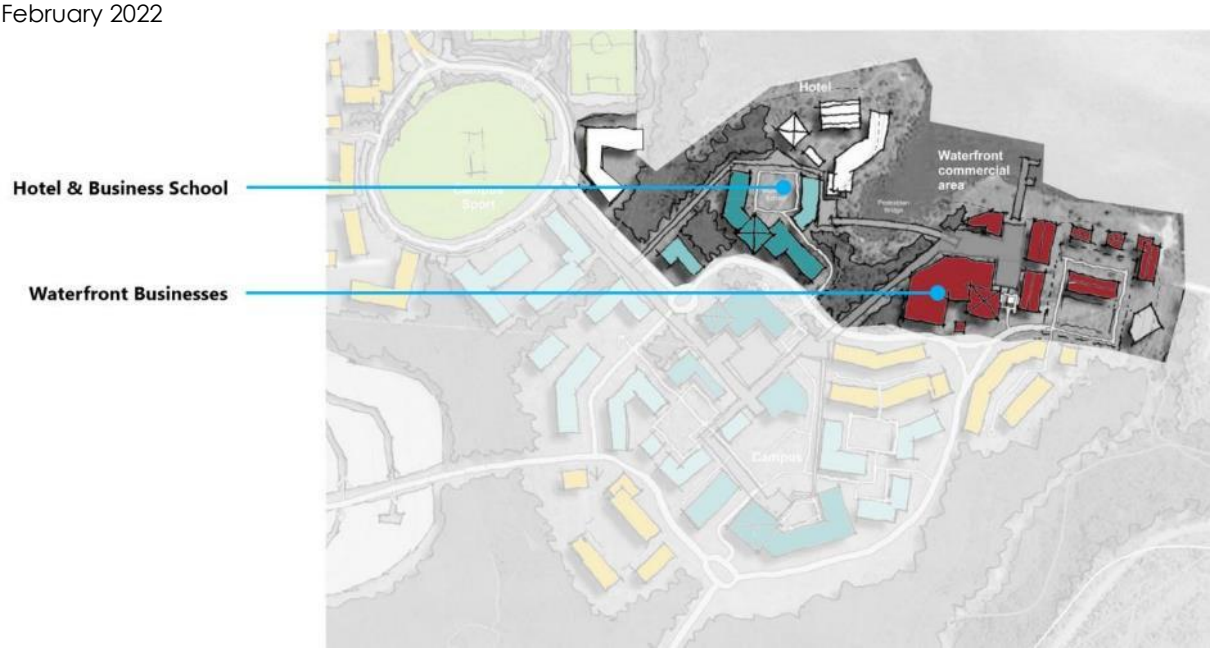


Figure 15: Figure depicting the Proposed Hotel and Waterfront Precincts (Source: Zutari 2020)

4.2.2. Proposed Civil Engineering Services

Information on Civil Engineering Services was extracted from the Engineering Services Report prepared by Aurecon, 2020. It should be noted that a letter has been provided by the George Municipality, confirming the proposed development is included in the general growth and development infrastructure planning.

4.2.2.1. Existing Water Services

George is supplied with water mainly from the Garden Route Dam, but it also makes use of various other pumped sources such as from the Gwaiing River. The water is purified at the George WTP (Water Treatment Plant).

Water is supplied to all areas within George through a network of bulk water lines distributing water to and from each reservoir supply area. The George Municipal Water Master Plan indicates that the proposed development falls within the George Main zone.

The current site is undeveloped except for bulk infrastructure crossing the proposed development area. Currently two (2) existing 600 mm Ø raw water rising mains as well as 450 mm Ø treated effluent pipeline crosses the area.

Existing network capacity as well as proposed upgrades in the vicinity of the site have been confirmed by the Municipality through the recent report done by GLS Consulting through their appointment by George Municipality, to draw up the Water and Sewer Master Plan for the Municipal area and to determine the effect of any form of development in the Municipal Area on the Water and Sewer Master Plan.

The proposed development SDP (Site Development Plan) was submitted to GLS in order to determine whether the existing water network system has sufficient capacity. According to GLS report, dated 14 June 2019, the existing WTP's and network has insufficient capacity to accommodate the proposed development.

4.2.2.2. Proposed Water

The water calculations are based on the "Guidelines for Human Settlement Planning and Design".

Existing network capacity as well as proposed upgrades in the vicinity of the site have been confirmed by the Municipality through the recent report done by GLS Consulting through their appointment by George Municipality, to draw up the Water and Sewer Master Plan for the Municipal area and to determine the effect of any form of development in the Municipal Area on the Water and Sewer Master Plan. The proposed development SDP (Site Development Plan) was submitted to GLS in order to determine whether the existing water network system has sufficient capacity.

According to GLS report, dated 14 June 2019, the existing WTP's and network has insufficient capacity to accommodate the proposed development.

According to Table 9.14: Water Demand from "Guidelines for Human Settlement Planning and Design", the following calculation was done to determine the Annual Average Daily Demand (AADD) for the various Land Uses:

Table 9: Calculated Average Daily Water Demand (Source: Aurecon 2020)

Land use Description	Calculations	Annual Average Daily (AADD)
Campus – University/Research institute/ Academy	$\left(\frac{163920\ m^2}{100\ m^2}\right) x\ 600$	983520 ℓ/day
Waterfront commercial development	$\left(\frac{41500\ m^2}{100\ m^2}\right) x\ 650$	269750 ℓ/day
Hotel	$\left(\frac{46500\ m^2}{100\ m^2}\right) x\ 900$	418500 ℓ/day
Medium density residential/Group housing	191 erven x 600ℓ/erf/day	114600 ℓ/day
Student Housing	1000 erven x 500ℓ/erf/day	500000 ℓ/day
Apartments / Flats / Student Housing	1210 erven x 500ℓ/erf/day	605000 ℓ/day
Free standing dwelling houses	91 erven x 600ℓ/erf/day	54600 ℓ/day
Recreational Spaces / Sport fields	15 000ℓ/ha/day x 7,60ha	114000 ℓ/day
Parks / Natural Assets / Preservation Areas	-	0 ℓ/day
Roads	-	0 ℓ/day
	TOTAL AADD	**3 059 970** ℓ/day

This equates to 3060 equivalent erven and from the design codes, it is expected to design for a peak factor of 4.

Peak Domestic Demand = 3 059 970 ℓ/d x 4.1
= 12 545 877 ℓ/d
= 145,2069 ℓ/s

Fire flow:
Such a development would fall into a moderate risk category and as such, the following would apply:

- 12 000 ℓ/min
- 6 hour design fire flow

With the supply spread over a wide area, according to the GLS Water Master Plan the existing reservoirs together with proposed upgrades will have sufficient storage capacity and capacity for fire flow conditions to accommodate this development.

The following Bulk services and external reticulation items are proposed for the development:

- New 120 500 kℓ/day Reservoir @ old WTP
- New 7m x 500mmØ bulk connection to New WTP
- Upgrade existing New WTP PS (install pump only) @WTP
- Upgrade existing New WTP (phase 1a of 4), 10 000 kℓ/day module
- New 335mmØ network reinforcement pipe of varying lengths
- New 315mmØ network reinforcement pipe of varying lengths
- New 160mmØ network main pipe of varying lengths

The internal water reticulation network will be connected at three (3) proposed external water connection points. The internal network will consist 160mmØ main distribution lines connecting to the external 315mmØ water mainlines.

The following internal services are proposed:

- 4680m of 160mm dia PVC-u class 16 water pipe
- 2131m of 315mm dia PVC-u class 16 water pipe
- 463m of 355 mm dia PVC-u class 16 water pipe
- 12 gate valves
- 13 Fire hydrants.
- 25-40mm dia HDPE class 16 water house connections

4.2.2.3. Existing Sewer Services

Wastewater Treatment Works (WWTW)

George Municipality has more than one WWTW. The proposed development falls within the Glenwood Pump Station sub-drainage area which drains to the Outeniqua WWTW.

Wastewater generated from the proposed development will gravitate to the existing Glenwood PS as well as the proposed Erf 464 pump stations and pump sewage through rising mains and gravity pipelines to the Glenwood PS and from there into the existing system towards the Outeniqua Wastewater Treatment Works, where it will be treated.

According to the GLS Sewer Master Plan for the Municipal area, insufficient capacity exists at the Outeniqua Wastewater Treatment Works. The Outeniqua WWTW is currently undergoing upgrades to increase its capacity.

Wastewater Reticulation System

A wastewater reticulation system exists within the adjacent neighbourhoods to which the proposed development sewage will be conveyed.

This proposed development area requires two (2) new sewer pump stations due to the site topography and the 14 June 2019 GLS report. The pump stations are required to drain approximately 70% of the total development with the remainder able to gravitate.

Sufficient emergency storage will be provided at the pump stations in order to mitigate events such as power outages, blockages and breakdowns. The current site is undeveloped except for bulk infrastructure crossing the proposed development area. Currently two (2) existing 600 mm Ø raw water rising mains as well as 450 mm Ø treated effluent pipeline crosses the area.

4.2.2.4. Proposed Sewer

According to the guidelines, the expected average daily wastewater flow is as follows:
Table 10: Average Daily Wastewater Flow (Source: Aurecon 2020)

Income group	Average persons per Dwelling	No of Erven	Litres per Dwelling
Varies	4	2301	450

Based on the above, the Average Dry Weather Flow (ADWF) for the development categories would therefore be:
Q = 2301 x 450 ℓ/d
= 1 035 450 ℓ/d
= 1035.45 kℓ/d
ADWF = 1.03545 Mℓ/d

For the remaining of Land Uses, we can assume that 70% of the water demand as determined under above will end up in sewer reticulation system:
Based on the above the ADWF for the remaining land uses would therefore be:
Q = (983 520 + 269 750 + 418 500 ℓ/day) x 0.70
= 1 170 239 ℓ/day
= 1 170.239 kℓ/day
ADWF = 1.170 Mℓ/day

The proposed development to be serviced is as follows:
2301 x 6 = 13 806 persons

The equates to peak factor of 1,80, which would lead to an expected Peak Dry Weather Flow (PDWF) as follows:
Q = (1 035 450 + 1 170 239 ℓ/day) x 1.80
= 3 970 240.2ℓ/day
= 3. 970Mℓ/day
PDWF = 45.952 ℓ/s

If an infiltration rate of 15% is used for the ingress of stormwater into the system, the Peak Wet Weather Flow (PWWF) is calculated as follows:
Q = 3 970 240.2 x 1.15
= 4 565 776.23 ℓ/d
= 4.565 Mℓ/d
PWWF = 52.844 ℓ/s

The proposed development will be internally reticulated by means of 160mmØ sewer main lines, whereby 70% of the development's generated sewer flow will gravitate towards two (2) proposed pump station. From the pump stations, the raw sewage will be pumped through rising mains of 160mmØ until it reaches the high point from where it will gravitate to the existing Glenwood PS.

The following internal services are proposed:

- 4078m of 160mm dia PVC-u gravity heavy duty sewer pipe
- 1155m of 160mm dia rising main
- 85m of 160mm dia PVC-u heavy duty sewer pipe
- 380m of 250mm dia PVC-u heavy duty sewer pipe
- 90 No Manholes.

- 110mm dia PVC-u house connection with end caps.

Pump Station

The topography of the development is such that the utilisation of gravity sewers in some areas is not feasible. In certain areas however, a gravity sewer system can be utilised, but only at the expense of deep trench excavations. In such cases, both wastewater pumping and gravity flow sewers will be technically feasible. Therefore, the development requires two (2) pump stations (26L/s and 15L/s) that will be fenced off. The pump stations will pump wastewater from areas which cannot be served hydraulically by gravity sewers.

The design of the proposed sewer pump stations will conform to pump station design pump capacities. Each pump station will be designed to accommodate the flow rate that gravitates towards it. The pump stations will have variable speed pump sets to accommodate the varying nature of the incoming sewer flows. A pump station consists of a sump to receive incoming sewage, and pumps that pump the sewage through a rising main to a wastewater treatment work or into a downstream stilling chamber as well as emergency storage facilities.

Erf 464 PS F1 @ 26 L/s

PS F1: 26 L/s
Number of pumps: 2 vortex impeller sewage pumps – 1 duty – 1 standby
Pump tempo = ± 33 L/s
Pipe material = 160mmØ class 12
Sump size= ± 5m3
Emergency Storage (8h storage) = ± 168 m3
Area emergency storage = ± 10m x 10m
Pumping storage = ± 18 m^3

Erf 464 PS F2 @ 15 L/s

PS F2: 15 L/s
Number of pumps: 2 vortex impeller sewage pumps – 1 duty – 1 standby
Pump tempo = ± 19 L/s
Pipe material = 160mmØ class 12
Sump size=± 3 m3
Emergency Storage (8h storage) =± Area emergency storage =± 8.2m x 8.2m
Pumping storage = ± 9 m3

4.2.2.5. Existing Stormwater Services

No formal stormwater exists within the boundaries of the proposed development. However, a catchment source point is located towards the lower side of the proposed development area. The Garden Route dam is also located towards the northern side of the proposed development area. This area of the proposed development forms part of the catchment source point, where stormwater flows through a portion of the area towards the larger catchment area watercourse. The stormwater drains from the catchment source point and accumulates stormwater as the watercourse is fed from other catchment areas. The stormwater then flows into the dam.

4.2.2.6. Proposed Stormwater Services

The proposed site is currently undeveloped and can be categorised as a “Greenfield Development”. Therefore, the proposed development is expected to increase the amount of stormwater runoff due to additional hard surfaces being constructed. Table 2 shows the summary of stormwater runoff calculations. The development aims to plan and design the proposed stormwater system in accordance with the best design practices.

Table 11: Stormwater runoff summary (Source: Aurecon 2020)

Description	Erf 464					
MAP (mm)	849mm					
Area	118.5ha					
Design Period	1:5 years					
Runoff Q (l/s)	Pre-Development			Post Development		
	1:5	1:50	1:100	1:5	1:50	1:100
	3247	9376	13764	13142	30394	37866
Dispersal	Existing Dams			Existing Dams		

A Conventional piped system is proposed for this development. Proposed internal services would include:

- 3790 of 450mm dia concrete stormwater pipe
- 54 No Manholes
- 26 No Catchpits
- 12 No Head walls

The planning of stormwater design elements must always be seen as a holistic process which incorporates much more than the infrastructural elements required in adequately dealing with stormwater. It affects a range of environmental goals and management principles and aims not only to mitigate negative impacts, but actively promote positive modifications in its application.

The design approach to be adopted for the proposed development (as discussed in detail in the Stormwater Management Plan), can be summarised as follows:

- Promotion of on-site infiltration;
- Minimise concentration of stormwater;
- Maintain pre-development run-off levels as far as possible;
- Enforcement of management principles;
- Identify escape routes for major floods;
- Responsible discharge of stormwater into downstream systems; and
- Allowing for the necessary attenuation.

Certain aspects will require further consideration during the detail design stage, such as:

- Stormwater needs to be responsibly conveyed to the existing watercourse;
- Stormwater collected along the watercourse needs to be able to reach the existing drainage infrastructure downstream;
- The site development plan needs to adequately provide for servitudes to accommodate major flows; and
- Maximisation of attenuation of the rainwater to ensure that most water can be retained.

The following mitigation measures need to be considered for water pollution:

- Develop, implement and monitor catchment litter management and water quality strategy;
- Ensure adequate provision of sanitation services;
- Ensure adequate provision of solid waste management services;
- Where possible make use of a SuDS treatment train to manage water quality;
- Install local / regional litter traps (as suggested in the report);
- Ensure that all attenuation facilities have adequate forebay's with extended attenuation to allow for adequate sedimentation; and

- Develop a stormwater management plan that incorporates the management of peak flows, litter and water quality. Such a plan should incorporate a lifecycle costing of the required maintenance to ensure that adequate resources are available so that design, once implemented, can be adequately managed – and perform as intended.

4.2.2.7. Proposed Telecommunication

Telecommunication and data sleeves will be provided in accordance with the reticulation layouts of future service providers. The installation of telecom sleeves will be covered with the detail design of the development and form part of the construction of the civil engineering services. The installation of all telecommunication sleeves will comply with the requirements of SABS 1200 LC.

4.2.2.8. Proposed Electrical Services

The proposed development is included in the general growth and development plans for the area supplied from the Glenwood substation. This pertains to the forecasted supply of electricity, based on the proposed rezoning and subdivision plan.

A new 66/11kV transformer will have to be installed at Glenwood Substation to cater for the future loads expected by the development. No 11kV bulk link infrastructure is current available in the vicinity and this infrastructure will have to be installed by the Municipality.

The current projected electrical load is as follows:

Stand	Area (Ha)	Total LV busbar Load	MV/LV Trfr Load	MV Feeder Load	HV/MV Trfr Load
Campus - University/Research institute/Academy	17.1	1643	1495	1383	1313
Waterfront commercial development	4.3	1372	1249	1155	1097
Hotel	1.2	83	76	70	66
Medium density residential / Group housing	4.9	105	96	88	84
Apartments / Flats / Student Housing	12.0	6016	5475	5064	4811
Free standing dwelling houses	8.7	387	352	326	309
Parks / Natural Assets / Preservation Areas	48.8	0	0	0	0
Recreational Spaces / Sports fields	10.5	210	191	177	168
Nature reserve	0.0	0	0	0	0
Public Street	10.9	0	0	0	0
0	0.0	0	0	0	0
0	0.0	0	0	0	0
Total Load (kVA)	**118**	**9816**	**8932**	**8263**	**7849**

4.2.2.9. Solid Waste

Refuse removal will be dealt with once a week as applicable to all the current residential areas in the George Municipal area.

Solid waste is based on an estimated 3.5 kg/person/day.
Therefore: (2301 units x 4 people per unit x 3.5 kg/day)
= 32 214 kg/day
= 32,214 tons/day

Volume = 32,214 t/d x 0.75

= 24,161 m^3/d
= 724,815 m^3/month

For all other land uses it can be assumed that approximately 12kg/100 m^2 of solid waste is generated per day.

Therefore: [(163 920 + 41 500 + 46 500) x 0.6 GLA] x 12kg/100 m^2
= 18 138.24 kg/day
= 18,138 tons/day

Volume = 18,138 t/d x 0.75
= 13,604 m^3/d
= 408,110 m^3/month

Total Volume of Solid Waste for Total Development = 724,815 m^3/month + 408,110 m^3/month
= 11 325.925 m^3/month

Based on preliminary discussions with George Municipality, the existing solid waste site will be able to accommodate the additional solid waste generated by the development.

4.2.3. Proposed Transport, Access and Internal Roads

4.2.3.1. Accessibility

Due to the desire to make this development highly inclusive and accessible, a well-designed road network is integrated throughout the site. Good planning practices aimed at taking the focus away from car-oriented development has been incorporated. This development proposal thus seeks to find a good balance between access roads, NMT infrastructure and the hierarchy of the various internal roads.

George is currently served by three phases of the George Integrated Public Transport Network (George IPTN). As Kraaibosch and George Campus is rolled out, it is anticipated that these developments will be well served by an extended Phase 1 of the George IPTN.

With the intention of providing access through public transport to the site it is imperative that the site is not only accessible through one access point. As such this development proposal introduces two new access points along Madiba Drive, which will be accompanied by the formalisation of the existing informal access point along Stander Road.

With multiple access points to the site, inclusivity is encouraged, and traffic congestion is relieved.

4.2.3.2. Existing Road Network

National Route N9 is a Class 2 Major Arterial under the jurisdiction of the South African National Road Agency Limited. In the vicinity of Saasveld Road it comprises of two lanes per direction. It experiences moderate traffic flows during peak hours and operates at an acceptable Level of Service.

Saasveld Road (Madiba Drive) is a Class 3 Minor Arterial, extending from Eden George to the north of Wilderness and Hoekwil. The road comprises of one lane per direction in the vicinity of the subject site. It experiences low traffic flows during peak hours and operates at an acceptable Level of Service.

Meyer Street is a Class 4 Urban Collector, serving the suburb of Eden, George. The road comprises of one lane per direction in the vicinity of the subject site. It experiences low traffic flows during peak hours and operates at an acceptable Level of Service.

Kraaibosch Way is a Class 4 Urban Collector, designed to predominantly serve the Kraaibosch development. The road comprises of one lane per direction. It experiences low traffic flows during peak hours and operates at an acceptable Level of Service.

4.2.3.3. Public Transport Facilities

George is currently served by three phases of the George Integrated Public Transport Network (George IPTN). As Kraaibosch and George Campus is rolled out, it is anticipated that these developments will be well served by the George IPTN.

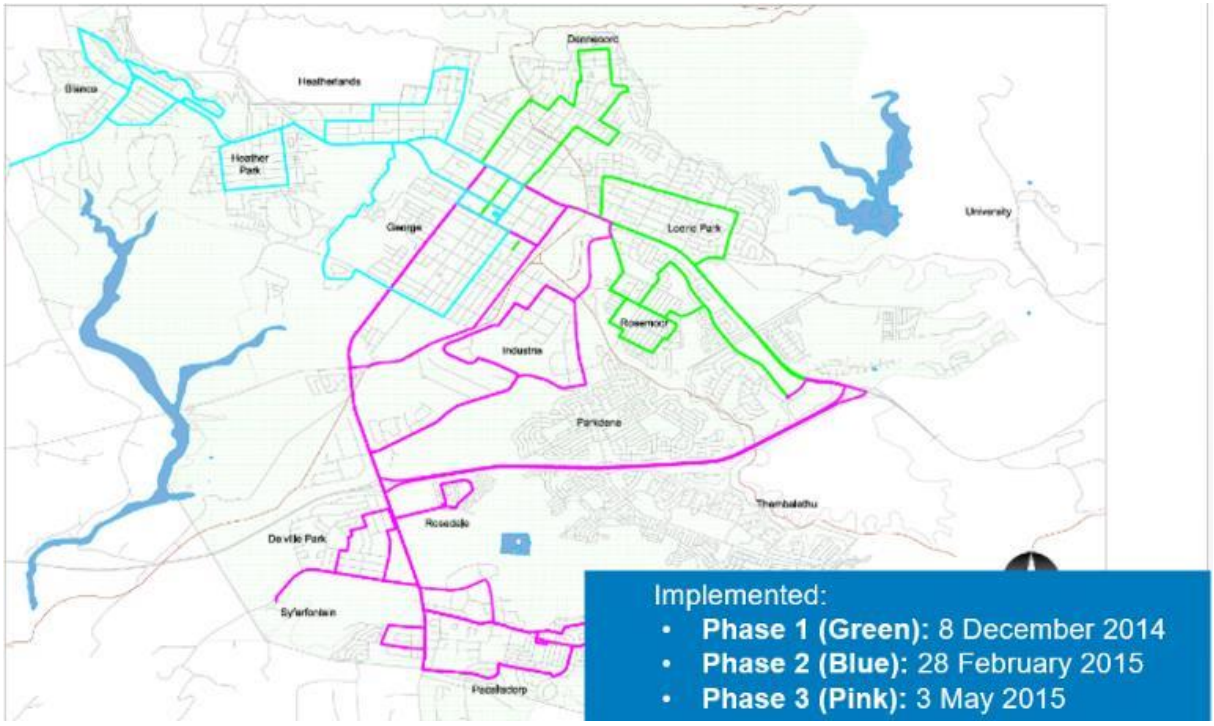


Figure 16: Public Transport Facilities (Source: SMEC 2020)

The GIPTN Unit was consulted regarding this proposal, with the following inputs being provided:

- *Based on the information provided regarding the proposal, there are two routes that fall within the vicinity of the accesses to the proposed development:*
  a) Route 24 (CBD – Loerie Park – Garden Route Mall) – refer to attached KMZ (Phase 1 Routes), and b) Proposed Route: NMU – CBD that forms part of Phase 6 of the GIPTN project that has not yet been rolled out.
- *Route 24 runs via Van Kervel Street the closest to the proposed Access 1 referred to in the application (approximately 560m distance) with Stops 194 and 193 located near the intersection of Van Kervel and Meyer St being the closest bus stops of Route 24 and approximately 520m from the proposed NMU-CBD Route and proposed bus stops 202 and 203 located at the intersection of Saasveld Rd and Meyer Street intersection. Access 2 is proposed approximately 170m from this intersection. Access 3 is further East about 800m from the proposed stop 202 (no bus stops are proposed by the GIPTN at this stage near the vicinity of Access 3).*
- *It is important to note that the abovementioned routes were never intended to cater for the development in question. In order for the GIPTN to plan services to the development proposed, it is important that the number of anticipated public transport trips are provided. Furthermore, information on roads proposed and earmarked specifically for public transport, needs to be provided for further assessment and comment.*

Taking into consideration the inputs provided by the GIPTN Unit, it has been recommended by SMEC that a revised Phase 6 of the George IPTN be used to service the needs of the George Campus.

4.3.1.4. Proposed Road Network

The site will be served by three accesses, as follows:

- Access 1 along Stander Street (opposite Arthur Bleksley Street);
- Access 2 along Saasveld Road (between Meyer Street & Access 3); and
- Access 3 along Saasveld Road (opposite Road 1).

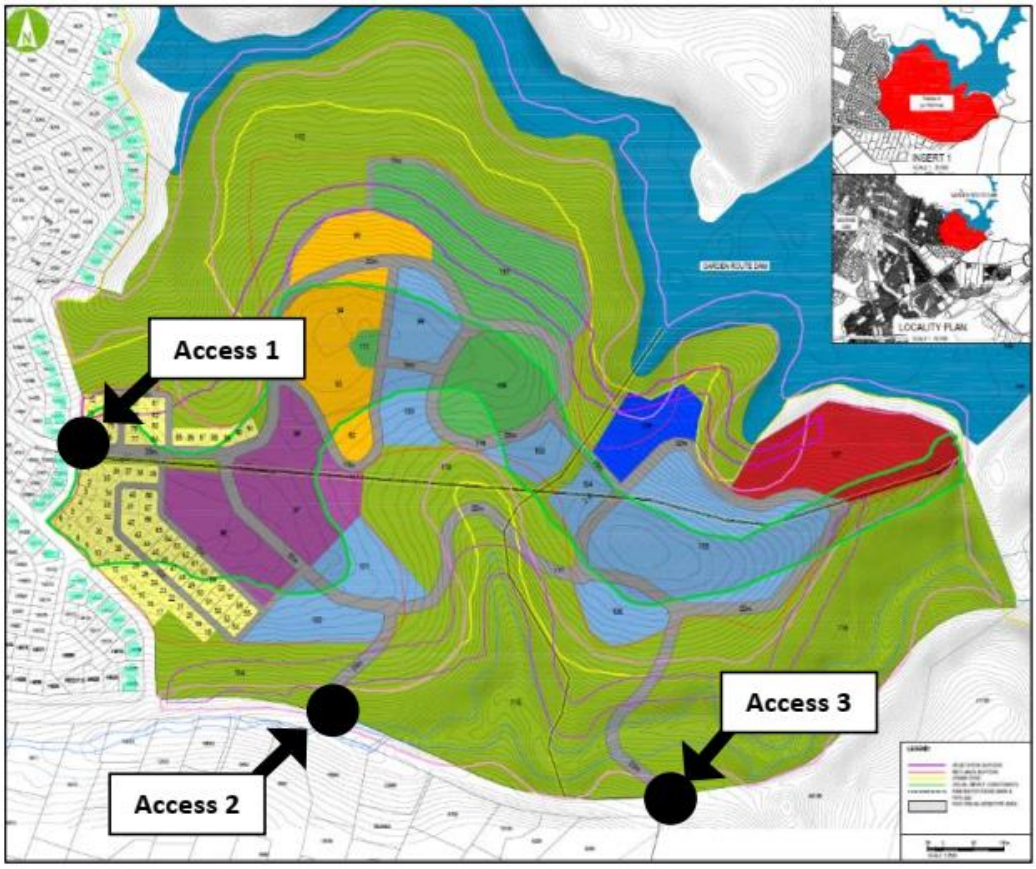


Figure 17: Proposed Site Accesses (Source: Aurecon 2019)

The access spacing requirements were derived from the WCG Access Management Guidelines (2020). This requires a 260-metre spacing between two uncontrolled full intersections along Class 3 roads within a semi-rural area.

Access 1 is situated at an existing intersection, and is therefore not evaluated. Access 2 along Saasveld Road is situated 300 metres to the east of Meyer Street. Access 3 along Saasveld Road is situated 600 metres to the east of Access 2. Both accesses therefore comply with the access spacing requirements.

Access to the proposed development area during construction will be provided East from Stander Street. No upgrades to the existing road infrastructure are required at this point in time. This road will however be upgraded following construction of the internal roads.

The two (2) main access roads to the campus after construction will be North from Madiba Drive, whereby the

design of the roads will be a combination of earthworks, filling and a bridge over the existing watercourse on site. The watercourse crossing might be a combination of culverts and earth fill, but this can only be confirmed during the design stage. The proposed detail regarding crossing of watercourses is included in the Engineering Services Report (Aurecon, 2020). The final design will be included in an amended EMPr prior to the commencement of construction.

There are approximately 45 383m² of planned paved roads in the proposed development. Road widths vary from 4.5m – 7.4m wide with Barrier/Mountable kerb and channels on the lower side of the roadway and concrete channels at intersections.

4.2.4. Resource Efficiency

The proposed development will address, inter alia, water, energy and resource demand management and efficiency measures to ensure that all devices and fittings are energy and water efficient, including, but not limited to the following:

- All toilets will have interruptible flush mechanisms, or the cistern will be supplied with a fitted weight to interrupt the flow.
- Dual flush toilet cisterns.
- All taps will include an aerator to reduce the flow of water to 6 litres / minute.
- Shower heads will have restrictor or aerators to reduce water flow to 10 litres / minute.
- Energy saving light bulbs such as CFL's and LED's will be installed instead of incandescent bulbs.
- Outdoor lighting will be restricted to a minimum.
- Adequate thermal insulation will be provided in roofs.
- Provision for installation of future solar geysers will be made.

These specifications will be brought through into the tender documentation in the design phase of the project.

In addition, the inclusion of renewable energy sources and green building principles as part of the design of the overall development will be investigated and actively encouraged by the Municipality. According to the Green Building in South Africa: Guide to Costs & Trends (2016), Green Building in South Africa is growing exponentially, and the green cost premium appears to be progressively diminishing over time as a result of advances in technology and experience. In 2016, the average green cost premium over and above the cost of non-green buildings was only 5,0 %.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1. Biophysical Environment

5.1.1. Climate

5.1.1.1. General Description of Regional Climate

George is typified by a mild maritime Mediterranean climate with mild to cold winters and moderately hot summers. It has a high rainfall, usually occurring in the winter months.

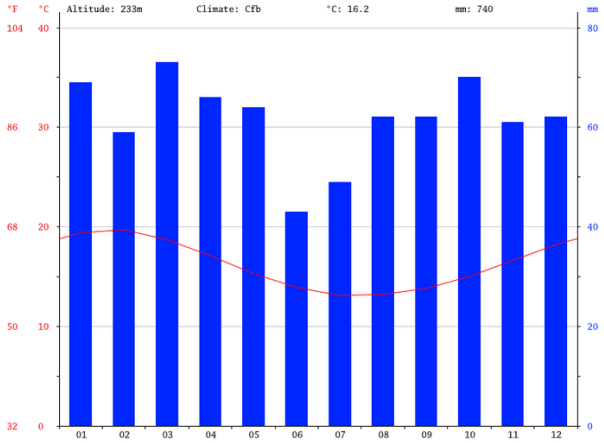


Figure 18: Average temperature and average rainfall data for George (Source: climate-data.org)

At an average temperature of 19.7 °C, February is the hottest month of the year, while July has the lowest average temperature of the year at 13.1 °C.

5.1.2. Topography

The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages. A larger drainage valley lies along the southern boundary and the Garden Route Dam shoreline lies close to the northern boundary. Slopes on the southern edge are steep, while those beyond the northern half are more gradual, except for the drainage valleys, which are relatively steep.

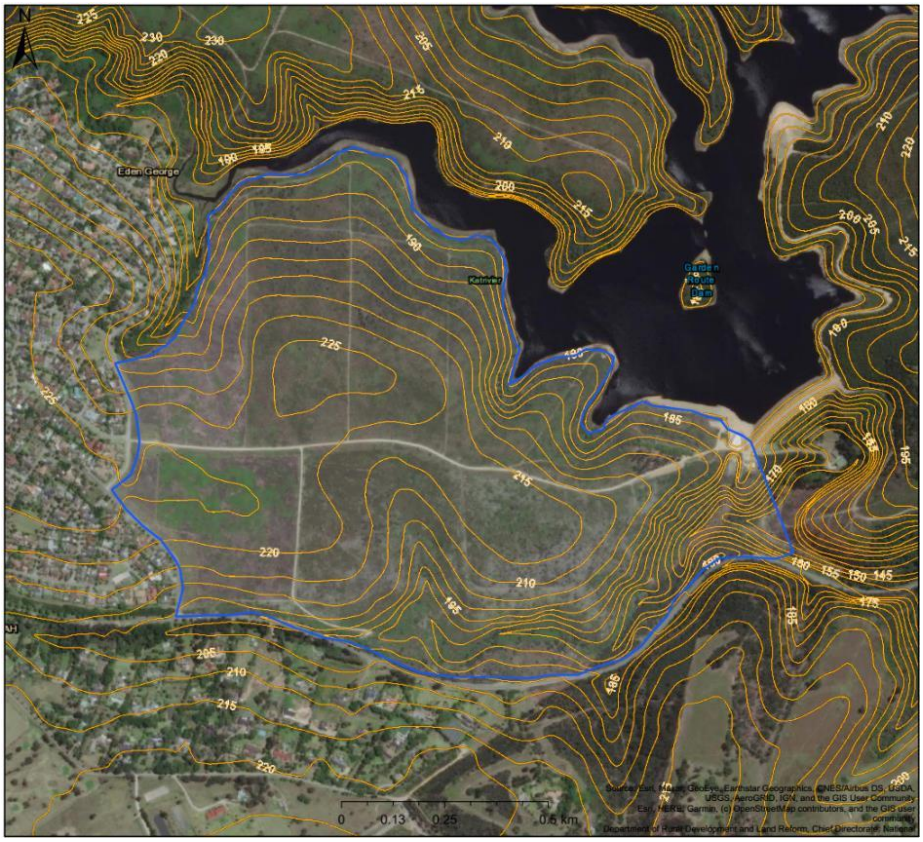


Figure 19: Topography of the study area, 5m contours (Source: CapeFarmMapper 2021)

5.1.3. Freshwater Resources

5.1.3.1. The Aquatic Environment

The rivers flow from the Outeniqua Mountains, over the narrow coastal plain, to form narrow estuaries at the mouth to the ocean. The larger rivers are typically perennial, as they are fed by precipitation and surface runoff during the winter rainfall season and supplemented by mountain seeps during the lower rainfall periods. These high gradient streams are typically peat coloured and humic stained.

The Swart River system joins the Kaaimans River downstream before the mouth to the Indian Ocean. Upslope of the dam and Kat River that feeds, is the George and Outeniqua Strategic Ground Water Area (2018). The site is within the Quaternary Catchment K30C of the Coastal Gouritz Water Management Area and the South Eastern Coastal Belt Ecoregion (Figure 8). Flow related activities, such as abstraction for domestic purposes, alien tree infestation, plantations and dams, are the largest drivers of degradation in watercourses of the area. The Garden Route Dam was identified by the NFEPA project as a wetland but not allocated FEPA status.

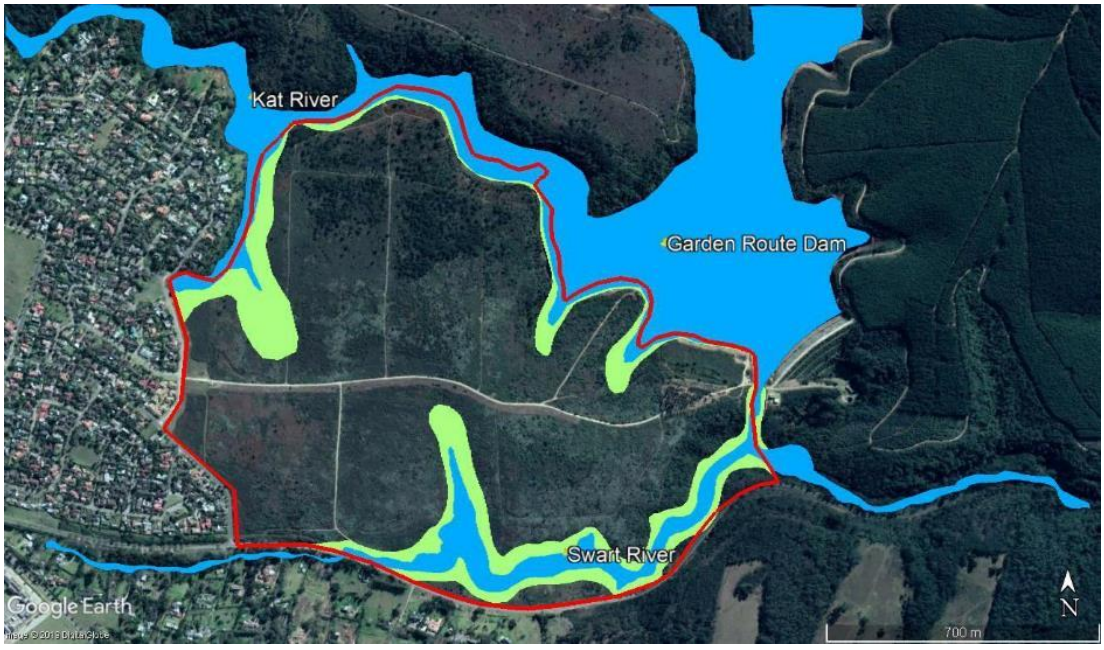


Figure 20: The study area in relation to the identified freshwater habitat. The blue polygon symbolising the delineated watercourses and the green indicating the riparian habitat surrounding them (Source: Fordham, 2019)

A "*watercourse*" is defined in NEMA and the NWA as a "*river or spring*" or "*a natural channel in which water flows regularly or intermittently" or a "wetland, pan, lake or dam into which, or from which, water flows*".

5.1.3.2. Strategic Water Source Areas

According to Fordham 2021, the study area is located within the Outeniqua Strategic Water Source Area for Surface Water. The mountainous area north of the site is mapped as the George and Outeniqua Strategic Water Source Area for Groundwater. Strategic Water Source Areas (SWSA) is where the water that is supplied is considered to be of national importance for water security. Surface water SWSAs are found in areas with high rainfall and produce most of the runoff. Groundwater SWSAs have high groundwater recharge and are located where the groundwater forms a nationally important resource. There are 22 national-level SWSAs for surface water (SWSA-sw) and 37 for groundwater (SWSA-gw). The SWSA-sw in South Africa, Lesotho and Swaziland occupy 10% of the land area and generate 50% of the mean annual runoff. They support at least 60% of the population, 70% of the national economic activity, and provide about 70% of the water used for irrigation. The

SWSA-gw cover 9% of the area of South Africa, account for 15% of the recharge, 46% of the groundwater used by agriculture and 47% of the groundwater used by industry.

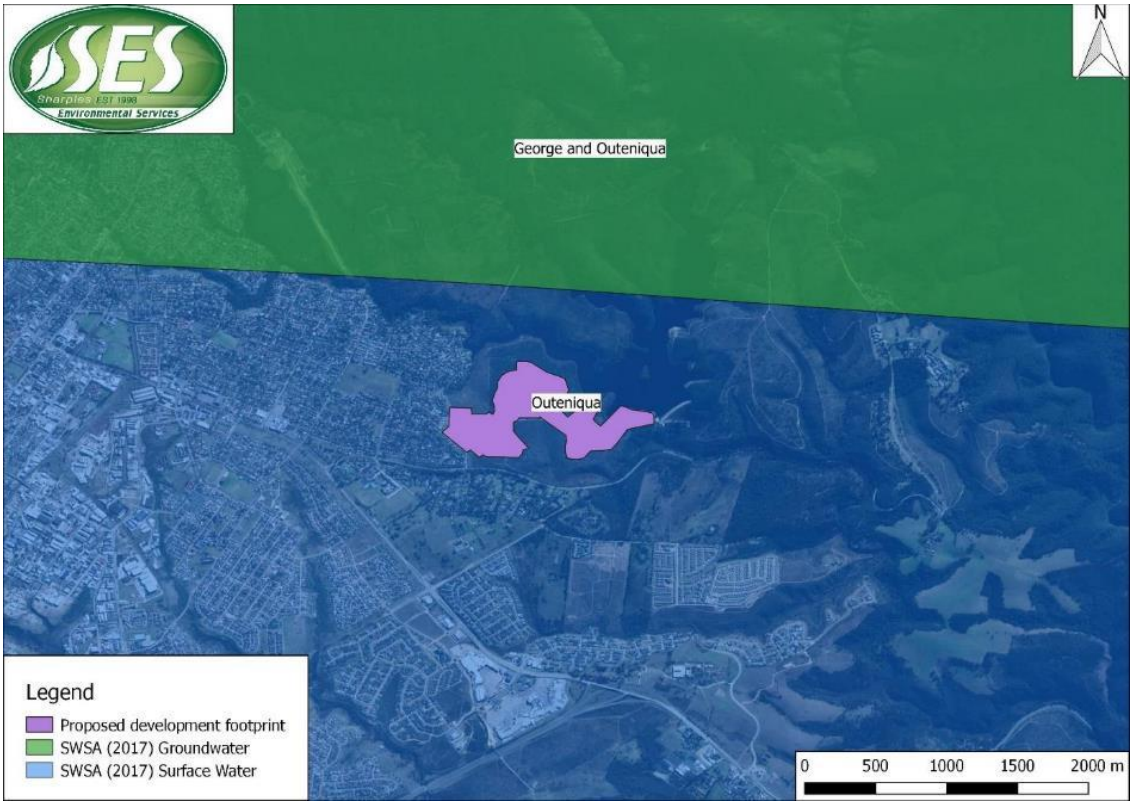


Figure 21: The site in relation to the Strategic Water Source Areas (Source: SES 2021)

5.1.3.3. Conservation Context

The Western Cape Biodiversity Framework (WCBF) is a spatial biodiversity plan recognized by both the Department of Environmental Affairs and South African National Biodiversity Institute. It identifies areas crucial for conserving a representative sample of biodiversity and maintaining ecosystem functioning. According to the WCBF (2017), "*ecosystem threat status tells us about the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends*".

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development.

There are small pockets of the study area that are classified as Critical Biodiversity Areas, such as a portion of wetland habitat in the south and terrestrial habitat in the eastern area. However, the majority of the site is considered to have potential for restoration or is mapped as an ecological support area. The reasons provided by the WCBSP (Pence, 2016) include Threatened Vertebrate and Water Resource Protection. Additionally, a segment along the dam in the northern part of the site is part of a protected area called the Katrivier Nature Reserve.

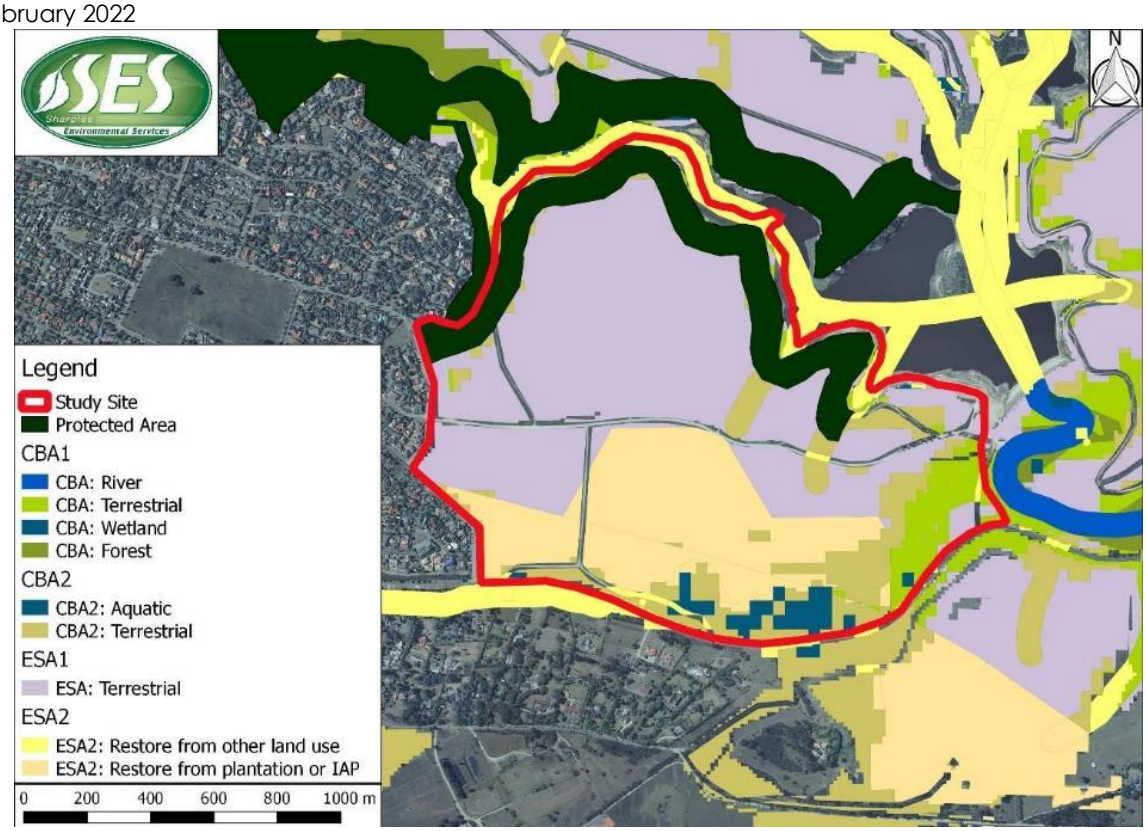


Figure 22: The site in relation to Western Cape Spatial Biodiversity Plan (CapeNature, 2017)

5.1.3.4. Water Quality

The George Municipality Laboratory Services tests the water quality at the new raw water works on a weekly basis. The water tested is sourced from the Garden Route Dam and the purpose of sample analysis is to ensure that the correct treatment is administered to ensure compliance with the standards for water for human consumption. A once off sampling was conducted by SES to assess against the targets for aquatic ecosystems and provide baseline data for future comparison. Three water samples were collected on the 29th of August 2019 from the study area. Two of the samples were sourced from the dam and the other from the Klein Swart River. The results are a snapshot of the conditions at the time of sampling, and will have changed since, but provided an indication of the status quo at the time of initial site assessment.

The water quality results for the sampling points Garden Route dam and Kat River indicate fair water quality from an aquatic perspective. However, the water quality at the time of sampling in the Klein Swart River to the south of the property, was poor and indicative of potential impacts from development. It is likely that the source of pollution is the Glenwood pump station and/or the associated sewage infrastructure that cross the stream a few meters above the sampling point.

Figure 23: Map of the study area showing the three water sampling points

The results indicated that although the dam water had some variables above the target limits for aquatic ecosystems, it was of fair quality at the time of sampling. However, there a significant number of pollutants entering the Klein Swart River. The greatly elevated Ammonia and E.coli levels downstream of the sewage pump station will have impacted upon the ecological health of that habitat. E.coli levels at the pump station point were more than double the concentration considered safe for intermediate contact recreational uses (DWAF, 1996a). These results indicated the potential problems on site.

5.1.3.5. Kat River and Garden Route Dam

The Kat River

The Kat River is a perennial stream with its source in the Outeniqua Mountains above the town of George. It flows along the edge of the developed area and then becomes dammed shortly upslope of the confluence with the Swart River to the south. The physical character of the river changes significantly over a relatively short longitudinal distance. Consequently, there is a steady decrease in the quality of river habitat in a downstream direction. Upslope of the urban area, the Kat River has a steep gradient and a substrate dominated by bedrock and boulders. However, as the mountain stream reaches the foothills, flowing along the edge of the town, the slope lessens, and an alluvial channel develops with extensive emergent vegetation.

Marginal wetland habitat forms along this reach. Anthropogenic changes such as an increase in hardened surfaces, vegetation clearance, and the introduction of alien invasive plants from forestry, have resulted in channel incision and loss of wetland habitat. Towards the confluence with the Swart River the channel becomes completely transformed by the dam.

The reach of the Kat River assessed has a moderately steep gradient and is within the Upper foothills longitudinal zone. It is situated within a semi-confined valley floor and has a narrow channel with limited floodplain development. The substrate is dominated by gravel and coarse sand. The river is relatively well vegetated but largely with alien invasive trees species such as *Acacia mearnsii*. It has been subjected to significant degradation

due to land cover and land use changes associated with urban development, plantation, damming, and alien invasive tree infestation. Additionally, the river and dam receive pollutants from the urban area. There are pollutants entering from urban stormwater inflows as well as from malfunctioning service infrastructure. It is important to manage the system wisely due to its value as a corridor network, domestic water provisions, and the important rivers downstream.

The Kat River has an overall PEC Score of 3.5 placing it within the Ecological Category D (Poor). This implies that it is largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.

The river has an EIS score of High, with many elements sensitive to changes in water quality/ hydrological regime.

Garden Route Dam

The Garden Route Dam provides the city of George its main water supply as well as acts as the recreational centre for the local residents. The dam was constructed in 1979 at the confluence of the Kat River and Swart River. While the development property is largely located along the bank of the Kat River, the Swart River is the major system entering the dam, which would in normal circumstances flow unhindered around the eastern edge of the property, toward the coast and join the Kaaimans Estuary. However, the system has been impounded and dam that does not release sufficient flows for the ecological reserve. Excessive damming of rivers affects the flow, which in turn affects water chemistry, sediment transport and average temperatures.

Most major manipulations of flow regimes are linked to in-channel large dams. The Garden Route Dam is an example of this, having manipulated the habitat and flow regime of the Kat River, Swart River, and the Kaaimans River downstream. The change from the natural river form and habitat to a dam has in turn decreased the biodiversity of these rivers. Disturbance-tolerant and alien invasive species have largely replaced the more sensitive indigenous species adapted to free-flowing conditions.

Freshwater Biodiversity Information System (FBIS) is a platform for hosting, visualising and sharing freshwater biodiversity information for South African rivers. According to FBIS, there are two fish species occurrence records within the Garden Route Dam. Both species are widespread, non-native species: *Lepomis macrochirus* and *Micropterus salmoides.* According to FBIS, there are three fish species occurrence records on the Swart River site (SWAR-00015) downstream of the Garden Route Dam. The species listed are:

- *Galaxias zebratus* (Castelnau, 1861) a Regional Endemic
- *Sandelia capensis* (Cuvier, 1829) a Regional Endemic
- *Pseudobarbus afer* (Peters, 1864) a Micro-endemic (Endangered)

Kariba weed (*Salvinia molesta)* was first noticed in the Garden Route Dam in 2013. Nutrients introduced from urban areas increase plant growth. The floating macrophyte can grow so thick that it blocks out sunlight and oxygen, with negative consequences for aquatic biota. The infestation is managed by spraying herbicide and introducing a biological control agent. *Cyrtobagous salviniae* weevils are a tiny beetle released on the dam which feed on the weed.

5.1.3.6. Klein Swart River Wetland

The reach of the Swart River system that will be impacted by the proposal can be classified as a channelled valley bottom wetland. Historically, it is likely that wetland habitat occupied the entire (although narrow) valley floor but various impacts through time have resulted in the loss of connectivity in wetland habitat along the reach. The channel incision has caused the loss of some marginal wetland habitat due to flow modification. The pockets of wetland habitat that remain consist largely of robust indigenous vegetation such as *Phragmites australis, Typha capensis, Pteridium aquilinum*, *Cyperus sp., Zantedeschia aethiopica, Helichrysum sp*. The disturbed areas are however dominated by alien invasive plant species such as *Acacia melanoxylon*, *Acacia mearnsii, Rubus*

cuneifolius, Arundo donax, and *Pinus sp*.

The wetland has been subjected to impacts caused by past forestry activities, infrastructure, and alien invasive plant species infestation. The construction of the road to the south of the wetland has directly destroyed habitat, altered flow movements, and increased sediment inputs. A sewage pump station has been constructed within the wetland habitat, pipelines cross the wetland, and the water quality analysis of the water indicated that this effluent is escaping into the system and causing pollution.

This has altered the morphology and hydrology of the wetland and resulted in habitat fragmentation within the valley. Any proposed development within this catchment will result in further impacts on the watercourse but there are opportunities to rehabilitate it.

Past and present impacts have resulted in significant wetland habitat loss in large sections of the system. The hydrological regime has deviated greatly from the perceived reference state due to changes in water movement and retention patterns. The geomorphological characteristics have been transformed from the natural condition largely through erosion and sedimentation. Channel incision and straightening resulting in no bank overspill are especially harmful to a system dependent upon over-topping of the channel.

Although the area is well vegetated with hydrophilic indigenous vegetation, most areas are infested with alien invasive trees. The infestation of alien invasive plants in the catchment has altered the surface runoff and water inputs of the wetland area. Within the wetland, these plants confine flows and smother indigenous vegetation from the periphery.

Additionally, the alien species decrease dry season flow which has resulted in terrestrial plant species encroaching into and establishing in the freshwater habitat.

The Present Ecological State (PES) of the Swart River Wetland in the south of the property is defined as Largely Modified represented by an overall 'D' score category for the WET-Health 2 assessment. This category is indicative of a system where a large change in ecosystem processes and loss of natural habitat and biota and has occurred. Should development on the property cause addition impacts from increased hardened surfaces, concentrated flows and pollutants, there will be a negative trajectory of change in wetland integrity.

At a desktop level the functionality of channelled valley-bottom wetlands as a whole tend to contribute less towards flood attenuation and sediment trapping than typical floodplain wetland types but would supply these benefits to a certain extent. Channelled valley bottom wetlands have potential for removal of nutrients and toxicants to some degree, particularly from diffuse water inputs from adjacent hillslopes (Kotze et al. 2009).

The indirect goods and services provided by the wetland, such as sediment and nutrient trapping, were assessed as being Moderate to High. However, the wetland has a very low provision of direct ecosystem services apart from the small amount it contributes to the open space recreational setting (such as cycling) on the property. The system is not significant in terms of food or resource provisions, education/research and/or socio-cultural. This is mostly due to the lack of any endangered species, no known traditional practices, and the poor condition of the system.

The Ecological integrity and sensitivity of the Swart River Wetland was assessed and obtained a Moderate EIS score.

The management objective was determined through the recommended ecological category of the wetland. This places it in the REC 'D' category which recommends maintaining the river in its present state. However, it is recommended that the development proposal incorporate basic measures to make improvements in ecological functioning (such as the halting and management of erosion and pollution and alien invasive removal that is in any case mandatory).

5.1.3.7. Minor Systems

There are three small drainage lines that concentrate runoff from the property into the Kat River and dam, and there is one tributary draining in a southernly direction into the Swart River Wetland. These tributaries are small natural systems with temporary flow. The systems are of similar ecological integrity as they share biophysical characteristics and have been similarly impacted by land use and cover changes.

The tributaries all have narrow, shallow channels that are stable despite being steep longitudinally. No erosion was evident within these catchments. The tributaries are well-vegetated with shrubs such as *Diospyros dichrophylla* and *Searsia glauca,* with an understory dominated by Helichrysum Sp. and *Pteridium aquilinum*. However, there is a moderate level of alien invasive tree infestation (largely *Acacia mearnsii, Acacia melanoxylon* and Pinus sp.). *Rapanea melanophloeos trees* (Cape Beech), a protected species, were observed within the southern tributary riparian zone.

The four drainage systems will have been impacted upon in the past by forestry activities associated with the planation on the property, but they are not currently subjected to anthropogenic impacts and function in a near natural manner. The present ecological state of the small tributary systems was determined to be within the "B" category, indicating that modification is limited to very few localities and the impact on habitat quality, diversity, size and variability is also very small or not evident. The proposed development is located within these catchments and will impact these systems.

The ecological importance and sensitivity category of the tributary network was determined as being 'Moderate' (C category). The systems do not have a high sensitivity as they are only intermittently inundated with no significant diversity of habitat along the reach. However, they act as an important ecological corridor.

HGM 4 is a small hillslope seep with an outflowing channel. The seep is located at the head of a drainage line that develops into a channel and joins the Kat River to the north. The system receives stormwater from the existing road off site and lateral inputs from urban development along the riparian edge on the northern side of the channel. Even prior to the development of housing in this area, the wetland will have been subjected to anthropogenic impacts from forestry activities. The channel is slightly incised but well-vegetated. Invasive alien plant species dominate the disturbed site (such as *Acacia mearnsii, A. melanoxylon, Solanum mauritianum, Pennisetum clandestimum, Rubus sp., and Canna indica*), however, indigenous plants such as *Pteridium aquilinum* and *Helichrysum sp*. are present.

The project will cause an increase in hardened surface area and removal of vegetation in the catchment which may alter the system's flow regime. The stormwater infrastructure of the development, if poorly designed, will increase and concentrate surface runoff into the system which may cause erosion. The entire project may also negatively affect the water quality of the channel due to increased sediment inputs and potential pollutants.

The Present Ecological State (PES) of the wetland system is defined as moderately modified represented by an overall 'C' category for the WET-Health assessment. The wetland is not in a natural state and much of the original wetland cover has been lost.

The hydrology score for the wetland has an impact rating of 3.8 (C) indicating that the hydrological processes have been modified by the stormwater outlet of the road and overall increase in hardened surfaces in its catchment. The geomorphological processes remain largely stable and therefore obtained a "B" Category impact score. However, without the adoption of mitigation measures this is likely to decrease. The vegetation element has undergone disturbance resulting in a "C" PES category. A "B" PES was obtained for water quality; however, this is a seasonal system and would likely be lower if perennial due to urban contaminates. It is anticipated that the health of the wetland is likely to deteriorate in the future due to the likelihood of increased anthropogenic pressures. Due to the small size of the system, and its steep slope, the wetland is vulnerable to perturbations.

However, should the design of the development incorporate an appropriate stormwater management plan and strictly avoid the wetland and associated buffer area, to maintain diffuse flows and curb erosion, it is anticipated that the hydrological health of the system will be maintained.

Seep wetlands are expected to contribute to some surface flow attenuation until soils are saturated, after which, their contribution to flood attenuation is very limited. Seep wetlands are commonly considered to supply a number of water quality enhancement benefits by removing excess nutrients and inorganic pollutants (especially nitrogen) produced by agriculture, industry and domestic waste. (Kotze et al., 2009). The HGM 4 hillslope seep provides limited ecosystem services as it is small and in a modified state. However, it attenuates stormwater runoff from the developed area and road. Additionally, it may trap sediments and nutrients from runoff to a small degree prior to entering the Kat River and dam. With the adoption of a buffer area the system can be maintained in its present condition, however, it is recommended that efforts are made to improve the vegetation component.

5.1.3.8. Drainage Lines

HGM 5 is a small drainage basin in the northern area of the site which transports sheetflow down slope toward HGM 4. The valley does not support a flowing stream as it is shallow and gently sloped. Water supply is not sufficient to exceed the threshold which would result in the formation of a clearly defined channel. Surface runoff does however collect toward the base of the slope near the confluence with HGM 4.

The HGM 6 and HGM 7 drainage lines have been flooded by the construction of the dam. The recent raising of the dam spillway has resulted in further submergence of the valleys. Any features which are characteristic of non-perennial streams are no longer present. Historically these systems would have been classified as episodic streams which merged with the Swart River before it was dammed and back flooded.

5.1.3.9. Artificial Wetland

Wetland is a term applied to a variety of ecosystems, depending on the definition used. The definition used in this aquatic assessment is sourced from the South African National Water Act (Act No. 36 of 1998) which defines a wetland as "*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*".

The guideline for the delineation of wetlands in South Africa – Practical Field Procedure for The Identification and Delineation of Wetlands and Riparian Areas (Rountree et al., 2008) – uses this definition. There are other definitions which specifically include artificially formed ecosystems.

Artificial wetlands are aquatic ecosystems where hydric soil features have developed, or where wetland plants have colonised, in historically non-wetland areas due to human activities.

On the property proposed for development, artificial wetland habitat has formed on the drainage divide, on the northern side of the road and south of the road below a culvert outlet. It is clear that a municipal raw water pipeline has a leak in this one location. The constant inundation of the surrounding terrestrial soils, for a sufficiently long period of time, has resulted in the development of a small artificial 'seep' wetland. It is important to note that the NWA definition of a wetland provides for 'normal circumstances'. The small wetland on the site is entirely artificial and the characteristic soils and vegetation would be terrestrial in nature under normal circumstances. Should the pipeline be repaired or decommissioned, this patch of wetland vegetation will slowly cease to exist, and the land will revert back to terrestrial fynbos habitat again.

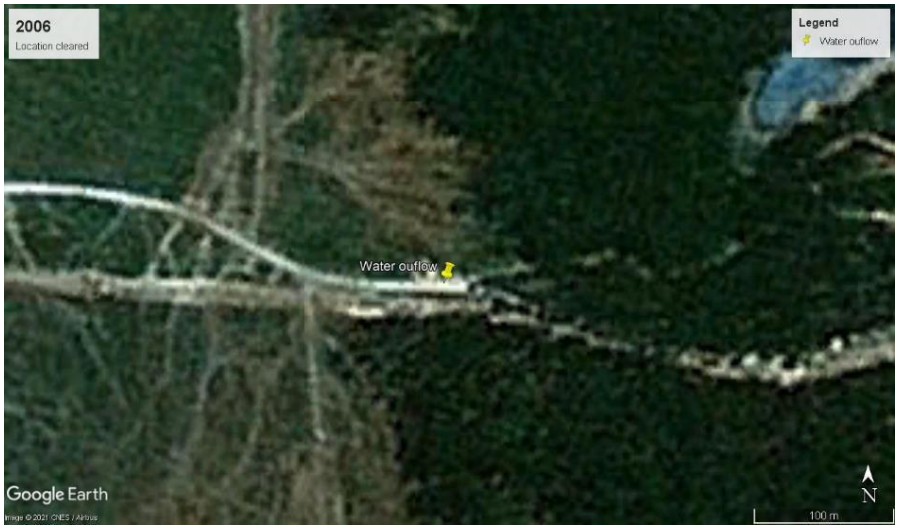


Figure 24: Location of the current pipe leak in relation to historic satellite imagery from 2006 showing the disturbed nature of the area.

Figure 25: Imagery from 2021 showing the changes to the natural characteristics of the site due to human influences

Figure 26: Photographs showing the source of water inputs from a leaking water pipeline

South African legislation does not distinguish between natural and artificial wetlands. Wetlands that have been artificially created will after a certain number of years have the same legal status as naturally occurring wetlands. This is important as there are instances where artificial (usually constructed wetlands) are created by a change in the landscape and have the capacity to fulfil the same functions as natural wetlands. The protection of these artificial systems can be necessary if the artificial wetlands provide valuable ecosystem services to society. However, to be worthy of such protection, a wetland would need to be somewhat self-sustaining in fulfilling these functions. The artificial wetland on the site is completely dependent on the pipe leaking. It covers a very small area and any ecosystem services supplied are insignificant. Most importantly, it is not self-sustaining as the pipeline could be repaired or decommissioned at any time. Therefore, the small pocket of artificial wetland does not warrant further investigation and its loss will not impact aquatic biodiversity.

5.1.3.10. National Freshwater Ecosystem Priority Areas (NFEPA's)

The National Aquatic Ecosystem Priority Areas (NFEPA) map provides strategic spatial priorities for conserving South Africa's aquatic ecosystems and supporting sustainable use of water resources.

FEPAs were identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Driver et al. 2011). However, the Klein Swart River, Kat River and the dam are not classified as FEPA systems despite being identified by the NFEPA project.

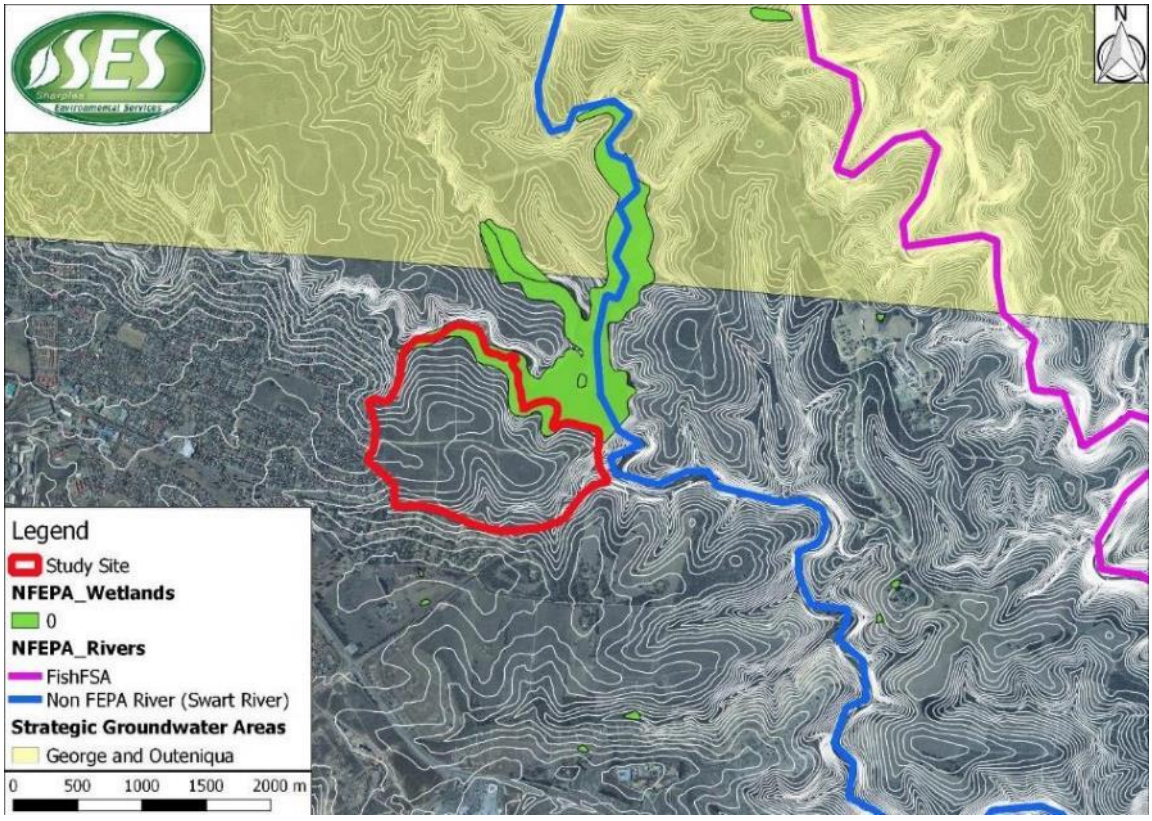


Figure 27: The site in relation to the Swart and Kaaimans Rivers (Source: Fordham 2019)

5.1.4. Soil, Geology & Agricultural Potential

5.1.4.1. Soil & Geology

The geology comprises mainly of phyllite and quartzite strata of the Kaaimans Group, with quartzitic sandstones of the Table Mountain Group (Cape Supergroup), as well as gneissic granite and granodiorite from George

Batholith (Cape Granite), which are highly erodible.

According to CapeFarmMapper (accessed March 2020), the area consists of soils with a marked clay accumulation, strongly structured and a non-reddish colour. In addition one or more of vertic, melanic and plinthic soils may be present. Soils are prismacutanic and/or pedocutanic diagnostic horizons dominant, B horizons mainly not red. The Agricultural Compliance Statement compiled by Johann Lanz (Sept 2021) confirms that the soils have limited potential for crop production. According to the land type soil data (included as Appendix 1 in the Compliance Statement), the site is totally dominated by fairly shallow, fairly poorly drained duplex soils (having a distinct transition from a sandy topsoil to a clay rich subsoil).

5.1.4.2. Agricultural Potential

According to Lanz 2021, the screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

A map of the proposed development area overlaid on the screening tool sensitivity is given in Figure 2. Because none of the land is classified a cultivated land, agricultural sensitivity is purely a function of land capability. The land capability of the site is predominantly 7 to 8, but varies from 4 to 9. Values of 4 to 5 translate to a low agricultural sensitivity, values of 6 to 8 translate to a medium agricultural sensitivity, and values of 9 translate to a high agricultural sensitivity. There are, however, only two pixels of 9 within the site. The variation in land capability is almost entirely due to the way that slope influences the generation of land capability by modelling.

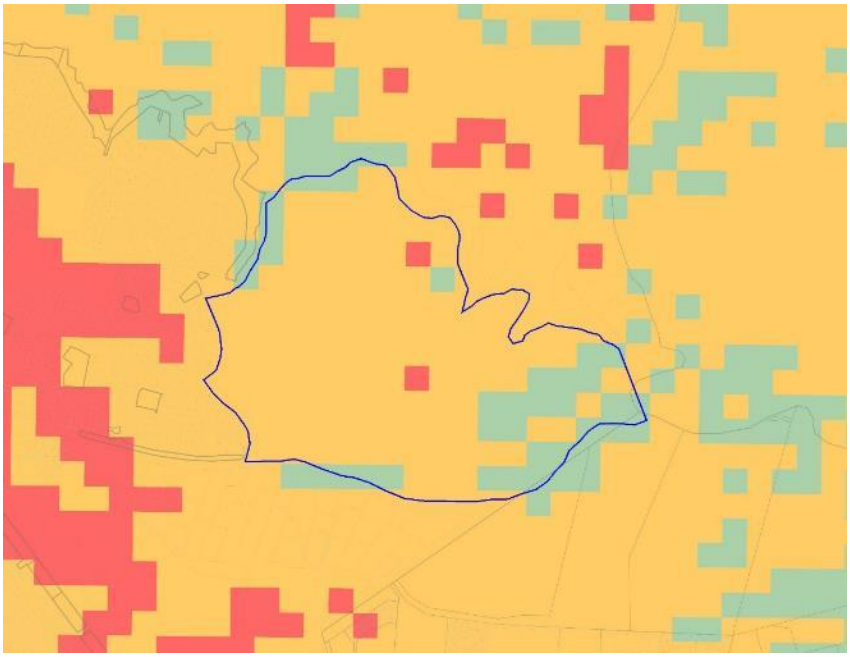


Figure 28: The proposed development footprint (blue outline) overlaid on agricultural sensitivity as identified by the screening tool (green = low; yellow = medium; red = high).

The high sensitivity attributed to the site by the screening tool was disputed by Johann Lanz in his assessment. A high sensitivity should indicate viability for cultivated crop production. However, there are a number of factors that limit the site's potential for crop production. The fact that the land has never been used for crop production, suggests that it is unsuitable.

The limiting factors are:

- Steep slopes on some of the land
- The fact that the land is municipally owned does not encourage its use for agricultural production.
- The soils have limited potential for crop production.

Because of these constraints, the site is not suitable for viable crop production, and is therefore assessed as being only of medium agricultural sensitivity rather than high agricultural sensitivity. High agricultural sensitivity should be reserved for land that is suitable for viable crop production.

5.1.5. Vegetation

5.1.5.1. Vegetation Type and Description

The Biodiversity Sensitivity Analysis was undertaken by Conservation Management Service (2018).

According to the analysis, the study area falls within the Garden Route Shale Fynbos and Garden Route Granite Fynbos vegetation units of the Vegetation Map of South Africa, Lesotho and Swaziland (Mucina et al, 2012).

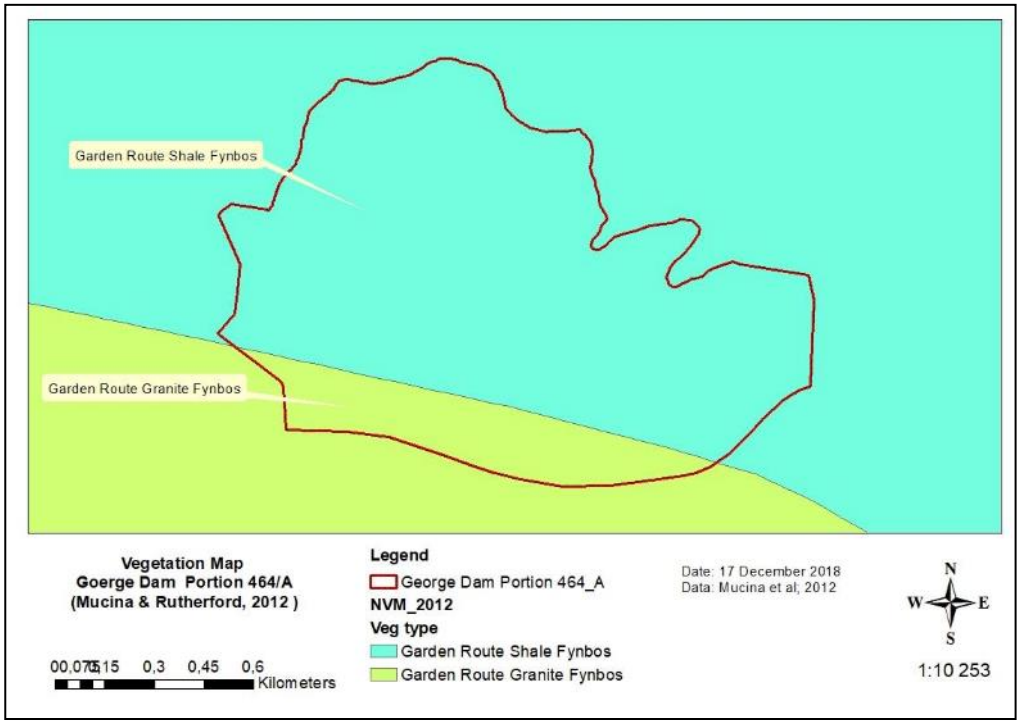


Figure 29: The study site (George Dam Portion 464A), represents Garden Route Shale Fynbos and Garden Route Granite Fynbos according to Mucina & Rutherford's 2012, Vegetation Map of South Africa, Lesotho and Swaziland (Source: Conservation Management Services 2018)

According to the CAPE Project Broad Habitat Units of the CAPE Floristic Kingdom (Cape Nature Conservation Board, 2002 & Cowling et al., 1999), the study area falls within the Knysna Afromontane Forest broad habitat unit.

Neither of these landscape mapping initiatives are at a fine enough scale for precise mapping of a unit as small as the study area (approximately 124ha). The above vegetation description does, however, help to give an indication of what the historical situation may have been, which is a mosaic of Shale Fynbos on the fire-prone ridges and Forest in the fire-protected valleys.

The entire study area can be described as a highly disturbed and formerly transformed habitat. The majority of the study area was covered by a commercial pine tree plantation in the past. Only a very narrow belt along the Garden Route Dam shore, the public picnic area and the small river along the southern boundary was free of pine trees.

Originally the area would have consisted of Fynbos on the flatter "upland" areas and Forest / Thicket in the valleys and on valley slopes. Some remnants of these natural vegetation types persisted during the forestry cultivation period and are the source for the current vegetation cover (i.e. since the pine trees were removed).

The study area currently consists of four broad habitat types, namely:

- Pioneer Fynbos;
- Pioneer Thicket / Forest;
- Highly disturbed areas with an ephemeral weed cover;
- Wetland habitat

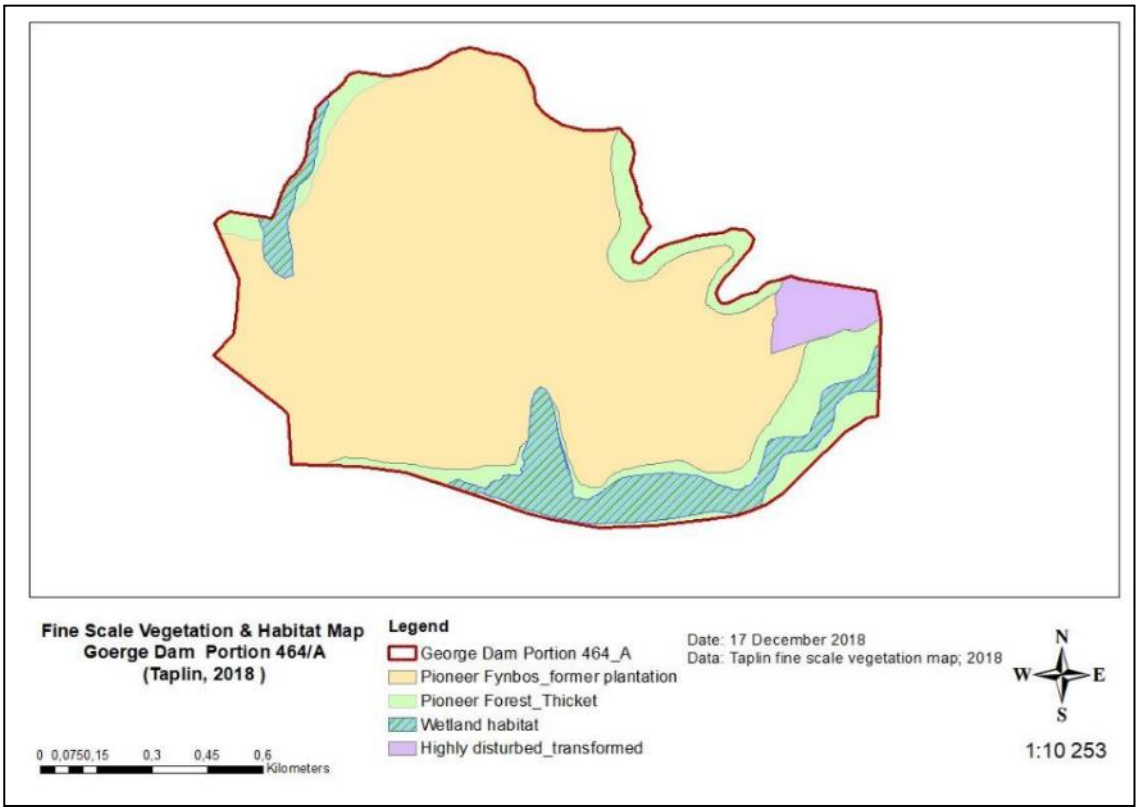


Figure 30: Fine scale vegetation and habitat units of the study site (Taplin ,2018).

5.1.5.2. Pioneer Fynbos

This vegetation occurs on the northern slope, flatter upper and plateau areas and persisted within the plantations, along with pioneer "weedy" species which germinated after the intense disturbance of pine tree harvesting. Persistent species include *Passerina vulgaris* and *Otholobium bracteolatum*.

Pioneer Fynbos plants include *Selago corymbosa, Chrysanthemoides monilifera* and *Helichrysum petiolare. Pteridium aquilinum* occur throughout the study site in large stands and were found to dominate specific areas. Sedges and grasses are well represented.

In addition to these species, invasive alien plants are invading the entire study site. The most important and ecologically concerning invasives are *Acacia mearnsii* (black wattle), *Acacia melanoxylon* (blackwood) and *Solanum mauritianum* (bugweed). Other alien weeds like *Amaranthus* sp., *Conyza bonariensis, Cirsium vulgare*

and alien grasses like *Paspalum* sp. and *Cortaderia selloana* (pampas grass) can be found throughout the study area.

In summary, this vegetation can be described as formerly transformed and thus highly disturbed. Areas of pioneer Fynbos highlighted as "Sensitive Fynbos Restoration Opportunity" on the vegetation and habitat sensitivity map and located on the slope of the northern portion of the study site can be classified as more sensitive (Coetzee 2007 and 2012 and Coetzee & Taplin 2018) and do have the potential to be rehabilitated into an improved ecological state with suitable management intervention.

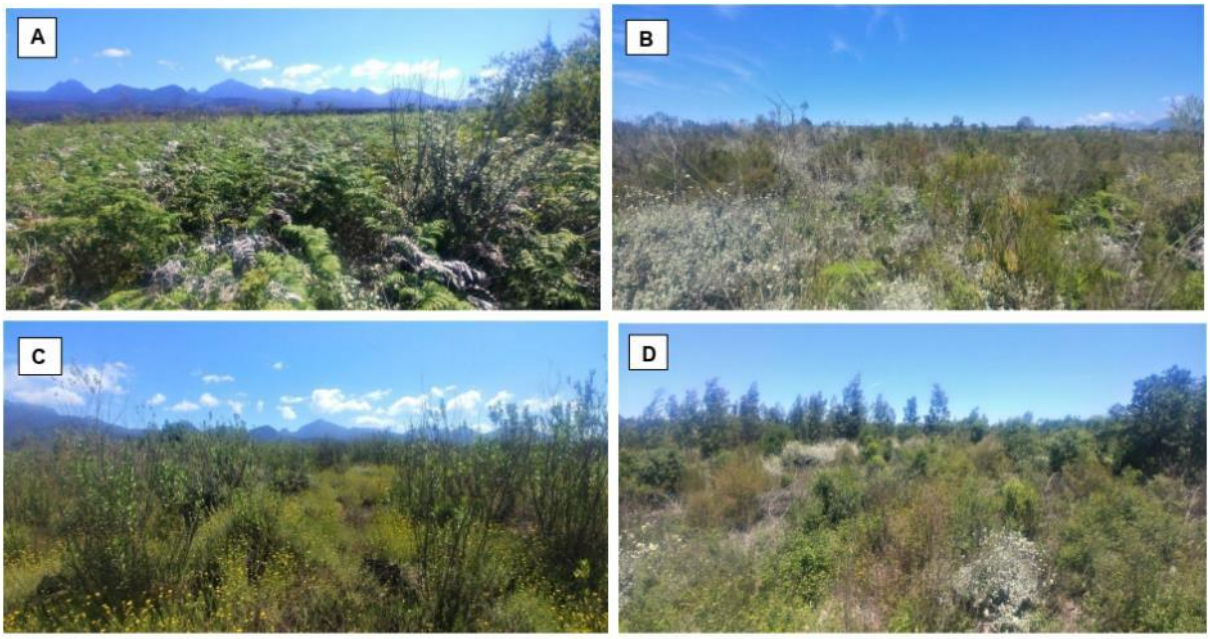


PLATE 1: Typical pioneer Fynbos on former pine tree plantation areas can be seen in images A to D. **A)** Shows extensive stands of *Pteridium aquilinum* dominating the landscape. **B)** Shows *Helichrysum petiolare* and *Passerina vulgaris*. **C)** Shows *Conyza bonariensis* and **D)** Shows *Acacia mearnsii* (black wattle) and *Acacia melanoxylon* (blackwood) aggressively invading the pioneer Fynbos areas.

Figure 31: Typical pioneer fynbos (Source: Conservation Management Services 2018)

5.1.5.3. Pioneer Forest / Thicket

These habitats are restricted within the valleys and on the slopes of the valleys and along drainages. These small forest patches are typical of drainage vegetation in the area and consist chiefly of *Rhamnus prinoides, Diospyros dichrophylla, Rapanea melanophloeos, Kiggelaria capensis* and *Rhoicissus digitata*.

Outside of the small valleys and along the south-facing slopes, the habitat is more thicket-like, currently consisting of pioneer Thicket and Forest trees returning after the removal of the pine plantations. The most important pioneer species are *Halleria lucida, Rhus lucida, Burchellia bubalina, Trimeria grandifolia*, *Gymnosporia buxifolia* and *Rapanea melanophloeos.* Seedlings and saplings of these forest pioneers have emerged in large numbers in some areas since the removal of the plantations. These Thicket / Forest areas, however, are also infested with invasive alien trees, mostly black wattle, blackwood and bugweed. With committed management, these habitats can be fully rehabilitated into useful conservation corridor areas.

5.1.5.4. Wetland

A small fluvial wetland occurs along the southern boundary of the study area. The small stream is fed by drainage from the study area and the Saasveld Road, in the form of seepage and runoff after rains.

The original wetland vegetation is completely dominated by invasive alien plants such as *Acacia mearnsii*, A. *melanoxylon* and *Solanum mauritianum*. Much of the original wetland cover has been lost due to this invasion.

A smaller wetland area occurs on the north western boundary, which later converges into a drainage line and feeds into the dam. This area is also heavily infested by *Acacia mearnsii*, *A. melanoxylon* and *Solanum mauritianum.*

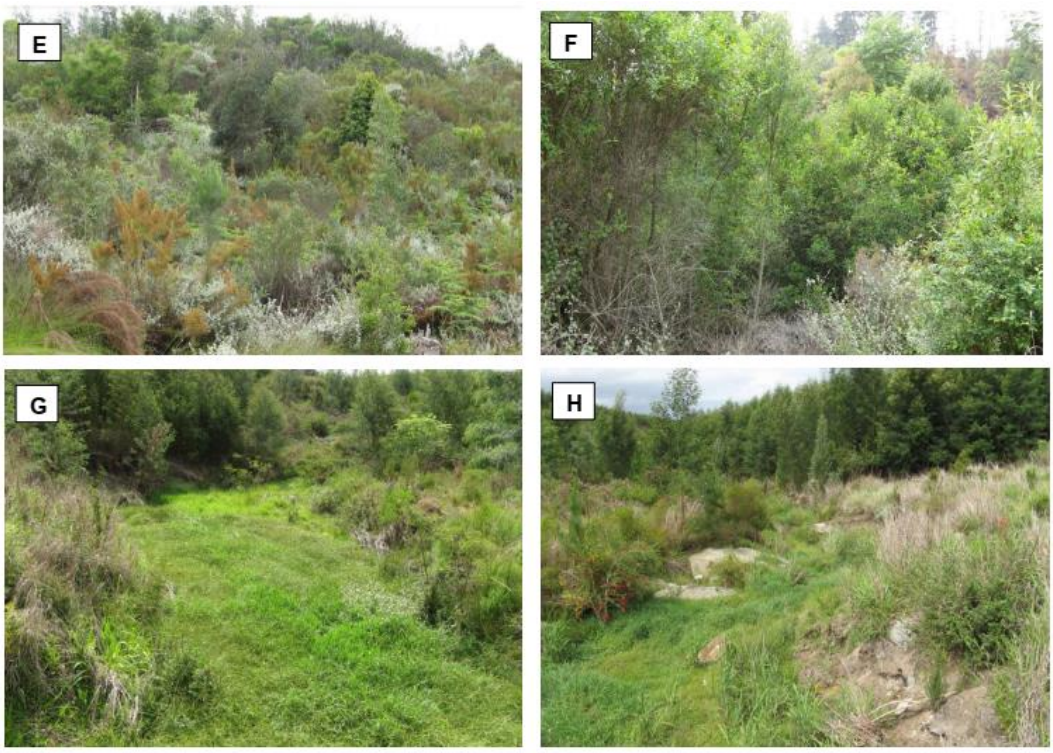


PLATE 2: E&F) Represent pioneer Forest / Thicket on south-facing slopes within the former pine plantation area. Typical pioneer species *Halleria, Searsia* and *Chrysanthemoides* dominate this vegetation type. **G&H)** Represent the wetland/drainage area along the southern boundary of the study area.

Figure 32: Representative pioneer forest/ thicket and wetland/drainage area (Source: Conservation Management Services 2018)

5.1.5.5. Highly Disturbed and Transformed Areas

These areas include the roads and road verges, public picnic area and similar areas of disturbance. The most prominent pioneers on these areas are grasses like *Paspalum dilatatum* and *Paspalum urvillei* (both alien) and *Eragrostis curvula*, *Cynodon dactylon* and *Ehrharta* species (indigenous). Being disturbed, these areas are also invaded by a host of weedy pioneers, both alien and indigenous.

A recent fire (October 2018) is estimated to have burnt at least 40% of the study area and both pioneer Fynbos and Pioneer Forest / Thicket have been affected. From what can be ascertained during the site visit, due to the high density of alien plants on site and dry conditions prior to the fire, the fire burnt extremely hot and has scorched large areas of topsoil, making these areas susceptible to further alien infestation and erosion. The pioneer stages of both Fynbos and Forest / Thicket are likely to persist, along with aggravated alien plant infestation.

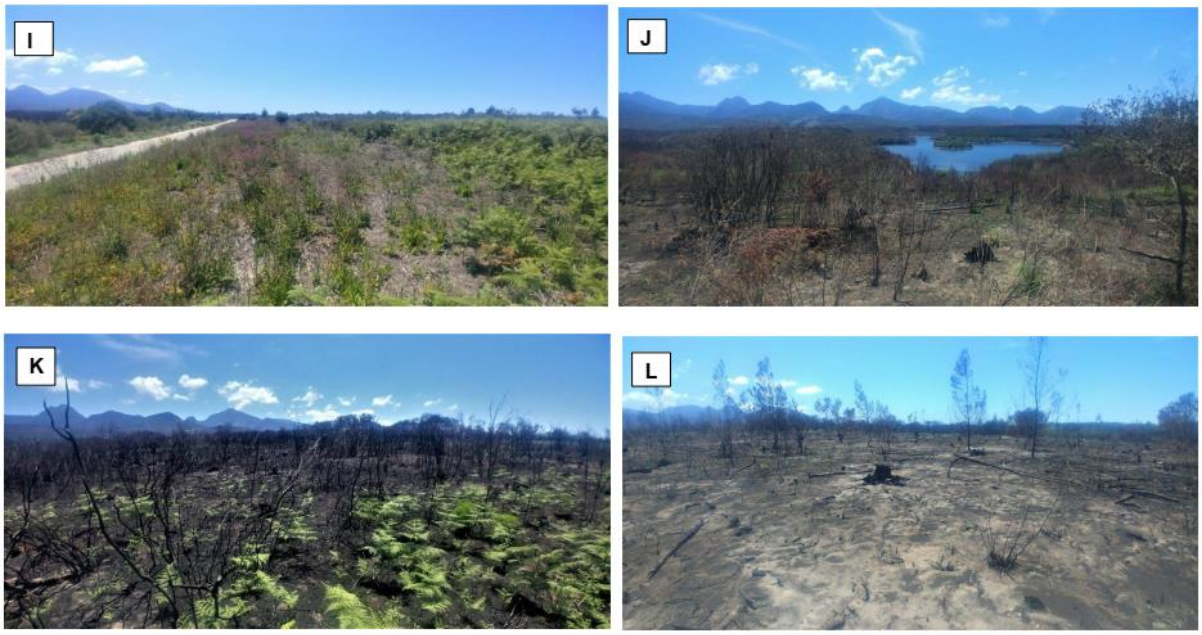


PLATE 3: **I)** Highly disturbed road verge dominated by grasses and weedy pioneers. **J)** The head of a drainage leading into the dam. **K)** Pioneer Fynbos consisting mainly of *Chrysanthemoides monilifera*, *Halleria lucida* and *Passerina vulgaris*, which is now burnt and a dense mat of *Pteridium aquilinum* replaces the previous vegetation. **L)** Scorched earth as a result of hot fires driven by dense alien plant infestations and dry conditions.

Figure 33: Highly disturbed areas (Source: Conservation Management Services 2018)

5.1.6. Biodiversity Sensitivity

5.1.6.1. Vegetation & Habitat

According to Mucina and Rutherford 2012, both Garden Route Shale Fynbos (GRSF) Garden Route Granite Fynbos (GRGF) are classified as Endangered vegetation types and have a conservation target of 23%. Only about 8% of GRSF is protected in formal conservation areas and private reserves, while only 1% of GRGF is currently protected.

However, as discussed above, the majority of the original and natural vegetation of the study site has been impacted upon and can now be regarded as transformed when compared with intact and natural GRSF and GRGF vegetation types.

Sensitive habitat variations and important ecological areas suitable for ecological processes and restoration efforts were, however, able to be identified within the study site. These are listed and described as vegetation and habitat sensitivity classes below.

5.1.6.2. Highly Sensitive Habitat

One important and interesting survivor of the original Fynbos vegetation occurs within the site boundary.

This is the bulb geophyte *Gladiolus fourcadei*, which has either been dormant as a bulb during the period when the area was covered with pine trees (in more than one rotation of trees, up to 50 years) or was able to flower and produce despite the alien pine tree cover.

Gladiolus fourcadei was discovered on the study area by members of the local CREW group prior to this assessment in 2012. Approximately 200 individual plants were counted after a fire event by the CREW group. Following this discovery, a survey of the area was carried out by the local CREW group and Conservation Management Services, represented by Mr Coetzee, to determine the exact extent of the plant (2012). The survey

revealed only a small number of flowering plants, but a much higher density of flowering plants can be expected after a fire event, as the species responds positively to fire.

The endemic *Gladiolus fourcadei* is classed as a Red Data listed species, categorized as Critically Endangered with a continuously decreasing distribution (Raimondo et al, 2012). It is thus a species under threat of extinction and, as such, should be afforded the highest level of protection, together with the habitat within which it occurs.

PLATE 5: M) The Critically Endangered *Gladiolus fourcadei*. **N)** The habitat in which *G. fourcadei* occurs on a southern slope.

Figure 34: Critically endangered Gladiolus fourcadei (Source: Conservation Management Services 2018)

5.1.6.3. Sensitive Fynbos Habitat Restoration Opportunity

The sloped contour area situated across the northern portion of the study site and previously identified as "Sensitive Fynbos Restoration Opportunity" (Coetzee, 2012) has almost completely burnt during the recent fires in October 2018. It was therefore difficult to ascertain the exact sensitivity status across the full extent of the area during the most recent site visits.

The following observations were made and support the previous sensitivity classification undertaken in 2012, as well as the current classification process:

- The areas classified as "Sensitive Fynbos Restoration Opportunity" by Coetzee in 2012 that remain unaffected by the recent fire represent a healthy diversity of fynbos species representative of pioneer Fynbos which has successively improved over time. This demonstrates the ability that the transformed vegetation has to regain natural vegetation integrity.
- The classified area provides a well-positioned ecological corridor to compliment the already declared Katriver Nature Reserve Protected Area.
- The area supports and provides an ecological linkage between the natural wetland in the west and the artificial aquatic system (Garden Route Dam) to the north.

Figure 35: Formerly classified as Sensitive Fynbos Restoration Opportunity Area (Coetzee, 2012) and now

completely transformed after the fires experienced in October 2018 (Coetzee & Taplin 2018). (Source: Conservation Management Services 2018)

5.1.6.4. Sensitive Forest / Thicket Habitat Restoration Opportunity

The "Sensitive Forest / Thicket Restoration Opportunities" habitat areas listed by Coetzee in 2012 remain mostly unaffected by the recent fire, apart from a narrow band of Thicket that is situated in the north-eastern portion of the study site which was burnt. The majority of these areas were not part of the previous pine plantations. These two factors facilitated the more comprehensive classification of these habitat areas.

Thicket and forest succession has taken place over time and these areas are positively contributing as ecological corridors, providing cover and suitable habitat for an array of species. Despite alien clearing efforts which have taken place over the last few years, the habitat has become far more aggressively invaded by alien invasive plants such as *Acacia mearnsii, Acacia melanoxylon* and *Solanum mauritianum* which are currently threatening the structure and function of this habitat type. If restoration efforts are undertaken successfully, further benefits such as habitat heterogeneity and landscape connectivity can be achieved. These areas therefore remain sensitive habitats which provide valuable ecological connectivity potential.

5.1.6.5. Low Sensitivity Disturbed Former Plantation

This habitat accounts for the largest portion of the study site and was exclusively used as a plantation area in the last fifty years. The area has been exposed to continued disturbance since the removal of the pines and no fewer than three fires have been through the area in the past 10 years. Roads and high loads of alien invasive plants are just a few of the disturbances present on the site. Due to the continued disturbance, pioneer Fynbos has persisted in a very degraded state and is dominated in most areas by a single plant species such as *Pteridium aquilinum, Helichrysum petiolare* or *Passerina vulgaris.*

5.1.6.6. Highly Disturbed and Transformed

These are areas that have been completely transformed and consist mainly of roads, picnic sites, car parks, mowed road verges and alien plants. These are the least sensitive and most transformed areas of the study site.

5.1.6.7. Conservation Status

Prior to the completion of the 2017 Western Cape Spatial Biodiversity Plan (WCSBP), the study area did not lie within any part of a Critical Biodiversity Area (CBA) and in fact the study site was mapped as a transformed area. With the completion of the much improved WCSBP in 2017 and the revised conservation, biodiversity and connectivity objectives much of the site now falls within biodiversity priority categories.

With specific reference to the study area, the following biodiversity priority categories can be explained:

- **Protected Area (PA) Nature Reserve**

The Katrivier Nature Reserve extends into the northern areas of the study site. These areas should be kept in a natural state with a management focus of maintaining or improving the state of biodiversity. It can be stated that the PA is completely transformed and occupied with alien invasive plants.

- **Critical Biodiversity Area 1 (CBA 1) Aquatic / wetland**

The aquatic or wetland CBA 1 is located in the southern most drainage line of the study site. The area is currently invaded by alien invasive plants and considerably atrophied. The management focus should be to maintain the area in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are would be appropriate.

- **Critical Biodiversity Area 1(CBA 1) Terrestrial**

The terrestrial CBA 1 area is located in the south eastern corner of the study site. This area is currently completely invaded by invasive alien plants. The land use objective should be to maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

- **Critical Biodiversity Area 2 (CBA 2) Terrestrial**

The terrestrial CBA 2 occurs in a narrow band within the south eastern portion of the study site as well as in the north eastern side. During the site visit it was established that the majority of the north eastern areas are completely transformed and occupied with alien vegetation. The objective should be to maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

- **Ecological Support Area 1 (ESA 1) Terrestrial**

The terrestrial ESA 1 represents the majority of the study area. If one refers to the Vegetation and Habitat Sensitivity Map, this area has mostly been classified as low sensitivity and highly disturbed and transformed, with the exception of the areas highlighted in pink which have been classified as sensitive Fynbos rehabilitation opportunity areas.

The most recent fire which has gone through the area has almost entirely burnt the terrestrial ESA 1 and scorched large areas of the soil due to hot fires caused by the alien vegetation and dry conditions.

The land management objective, according to the revised WCSBP, is to maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.

- **Ecological Support Area 2 (ESA 2) Climate Corridor, River, Wetland**

The ESA 2 climate corridor, river and wetland areas occur in the southern portion of the study site. These areas are also invaded by alien plants and are in a transformed state. According to WCSBP, these areas should be restored and / or managed to minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.

The Red Listed and Critically Endangered *G fourcadei* falls within the river and climate corridor ESA 2, Terrestrial CBA 2 as well as the Aquatic / wetland CBA1. The applicable management priorities should be stringently enforced here.

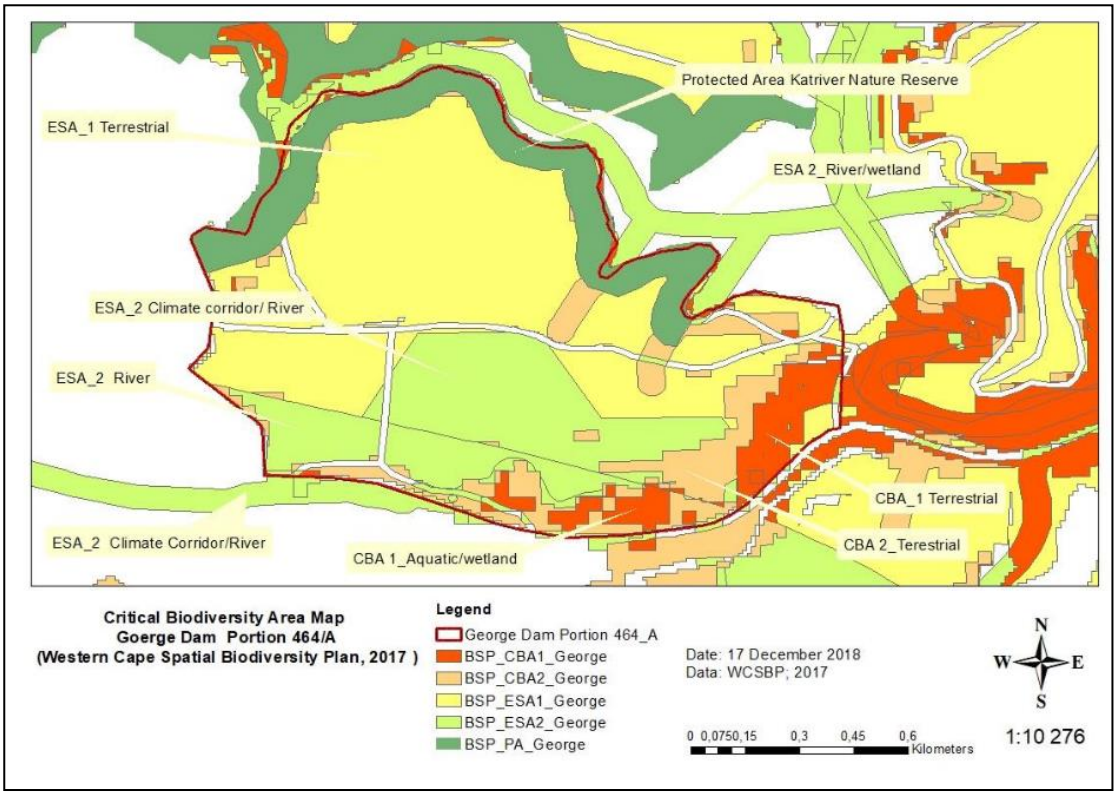


Figure 36: Critical Biodiversity Area Map of the George Dam study site portion 464A, (WCSBP, 2017) (Source: Conservation Management Services 2018)

5.1.7. Fauna

The study area lies at the George municipal urban edge and has been regularly subjected to a high incidence of anthropogenic disturbances like forestry activities, municipal maintenance activities, public recreational use of the area and even squatting. Predatory domestic dogs and cats from the adjacent residential areas have also contributed to faunal disturbance.

As a result of this long and persistent disturbance, only the most tolerant of the larger vertebrates still occur in the study area. Examples are bushbuck (*Tragelaphus scriptus*), bushpig (*Potamochoerus porcus*) and baboon (*Papio ursinus*), all of which generally persist in the area, even in pine tree plantations. The more sensitive habitat specialist species like blue duiker, grysbok, leopard and honey badger have retreated into areas of lower disturbance in the mountains and forests to the north and east.

The table below, representing vertebrate fauna diversity and occurrence, tabulates species which are either confirmed to occur by Coetzee (2007 and 2012) and more recently by Coetzee & Taplin (2018) or are likely to occur due to the typical habitat which is represented within the proposed site and surrounding area.

Table 12: Vertebrate faunal occurrence for the study site (Source: Conservation Management Services 2018)

VERTEBRATE FAUNAL OCCURRENCE				
Vertebrate	Species	Confirmed	Likely	Possible
Amphibians	11	1	7	3
Reptiles	40	3	31	6
Mammals	53	3	31	19
Birds	156	6	150	150

5.1.7.1. Mammals of Conservation Concern

The table below, compiled by Conservation Management Services (2018) lists the Red Data vertebrate faunal species that are likely to occur on the proposed site and surrounding areas. The Red Data species and distributions are according to Friedman & Daly (2004).

The long-tailed forest shrew is listed as Near Threatened due to the increasing loss of forest habitat. The presence of this species is considered highly likely because the Forest / Thicket habitat of the study site is very suitable for these indigenous forest-loving species. They are known to occur in the general area but are only known from true Forest or Forest / Fynbos transition areas.

The fynbos golden mole and Cape golden mole are considered likely to occur in the study area. The golden moles are restricted to fynbos and forest habitat. The three bats are also classed as Near Threatened.

The white-tailed rat is considered to be Endangered due to large-scale loss of habitat which includes Fynbos, Renosterveld and southern Savannah Grassland. If this species does occur in the area, its continued existence will be ensured by retaining areas of the natural rehabilitating Fynbos habitat as open space.

The African wildcat is common and widespread, and used to be listed as a Red Data species, because they freely hybridize with domestic cats and no longer occur in genetically pure populations near to developed settlements.

The striped weasel is likely to occur in the study area and it is considered to be under threat due to habitat and prey reduction. On the study area, this species will have adequate habitat in the unaffected riverine, dam shore and forest areas.

Table 13: Red Data listed mammals that are predicted to occur on the site (Source: Conservation Management Service 2018)

RED DATA SPECIES			
COMMON NAME	**SCIENTIFIC NAME**	**RED DATA CATEG**	**PREDICTED OCCURRENCE**
Long-tailed forest shrew	*Myosorex longicaudatus*	Near Threatened	Likely
Fynbos golden mole	*Amblysomus corriae*	Near Threatened	Likely
Cape golden mole	*Chrysochloris asiatica*	Data Deficient	Likely
Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Near Threatened	Possible
Cape horseshoe bat	*Rhinolophus capensis*	Near Threatened	Possible
Temminck's hairy bat	*Myotis tricolor*	Near Threatened	Possible
White-tailed rat	*Mystromys albicaudatus*	Endangered	Possible
African striped weasel	*Poecilogale albinucha*	Data Deficient	Likely

5.1.7.2. Birds of Conservation Concern

Two of the bird species that could possibly occur in the area are classed as Red Data species (Barnes, 2000). They are the Stanley's bustard (*Neotis denhami*) and the grass owl (*Tyto capensis*) which are not really provided with

suitable habitat in the study area but may occur occasionally or temporarily.

Their favoured habitat, open but tall, dense grassland is in any case artificial in the study area and is far too small to support sustainable natural populations of these birds.

In addition to the Red Data bird species, the endemic or near-endemic bird species of the study area should also be considered important because these species are endemic to the subregion, which is thus entirely responsible for their global survival. The endemic or near-endemic bird species which are predicted to occur within the study area are as follows:

Table 14: Endemic and near endemic bird species which are predicted to occur in the area (Source: Conservation Management Services 2018)

COMMON NAME	SCIENTIFIC NAME	PREDICTED OCCURRENCE
Jackal buzzard	*Buteo rufofuscus*	Confirmed
Cape francolin	*Francolinus capensis*	Confirmed
Knysna turaco	*Tauraco corythaix*	Confirmed
Karoo prinia	*Prinia maculosa*	Confirmed
Karoo robin	*Erythropygia coryphaeus*	Confirmed
Victorin's warbler	*Bradypterus victorini*	Possible
Fiscal flycatcher	*Sigelus silens*	Confirmed
Grass bird	*Spenoeacus afer*	Confirmed
Orange-breasted sunbird	*Nectarinia violaea*	Confirmed
Lesser double-collared sunbird	*Nectarinia chalybea*	Confirmed
Greater double-collared sunbird	*Nectarina afra*	Likely
Cape white-eye	*Zosterops senegalensis*	Confirmed
Southern tchagra	*Tchagra tchagra*	Likely
Cape weaver	*Ploceus capensis*	Possible
Swee waxbill	*Estrilda melanotis*	Likely
Cape bulbul	*Pycnonotus capensis*	Confirmed
Black korhaan	*Eupodotis afra*	Possible
Chorister robin	*Cossypha dichroa*	Possible

Most of these birds are associated with Fynbos or Thicket and Forest habitat, which confirms that the restoration of the more sensitive fynbos and forest/thicket vegetation would aid in the conservation of these endemic and near-endemic bird species.

In the vicinity of the project area, these habitats are well protected in the Groeneweide forests, seaward coastal forests and Fynbos areas. The Open Space areas on the Garden Route Dam study area will also provide valuable habitat for the conservation of these endemics and near endemics. The study area is thus not critical for the conservation of these species, but is and can become locally important bird habitat, or stepping-stone corridor habitat.

5.1.7.3. Butterflies of Conservation Concern

Marita Alant of SANParks recommended that the Applicant appoint a butterfly expert to assess the property for any butterflies of conservation concern. As such, a butterfly survey was conducted by Dave Edge & Associates in October 2019. The butterfly taxa actually recorded at the site during the surveys are listed below. The host plants known for the butterfly species recorded are given in the last column of table.

Table 15: Butterflies observed at the development site (Source: Dave Edge & Associates 2019)

SCIENTIFIC NAME	COMMON NAME	Fig.	GPS COORDINATES		HOST PLANTS
Cassionympha cassius	Rainforest Brown	3	33°57.907'	22°30.304'	Various Poaceae
Cacyreus fracta fracta	Water Bronze	4	33°57.871'	22°30.463'	*Pelargonium* species
Danaus chrysippus orientis	African Monarch	5	33°57.733'	22°30.159'	*Asclepias physocarpa*
Papilio demodocus	Citrus Swallowtail	6	33°57.944'	22°30.585'	*Vepris lanceolata*
Pieris brassicae	Cabbage White	7	33°58.077'	22°30.518'	*Heliophila* species
Pontia helice	Meadow White	8	33°57.944'	22°30.585'	*Heliophila* species
Spialia spio	Mountain Sandman	9	33°57.838'	22°29.995'	*Hermannia* species
Vanessa cardui	Painted Lady	10	33°58.077'	22°30.518'	Various

The proposed development area on George Dam Portion 464A does not appear, as per the findings of the butterfly survey, to contain any rare or endangered butterflies, and the eight butterflies recorded are reasonably common and widespread.

5.2. Archaeology & Heritage

The SAHRIS PaleoSensitivity Map shows the entire development area to be of Low Sensitivity.

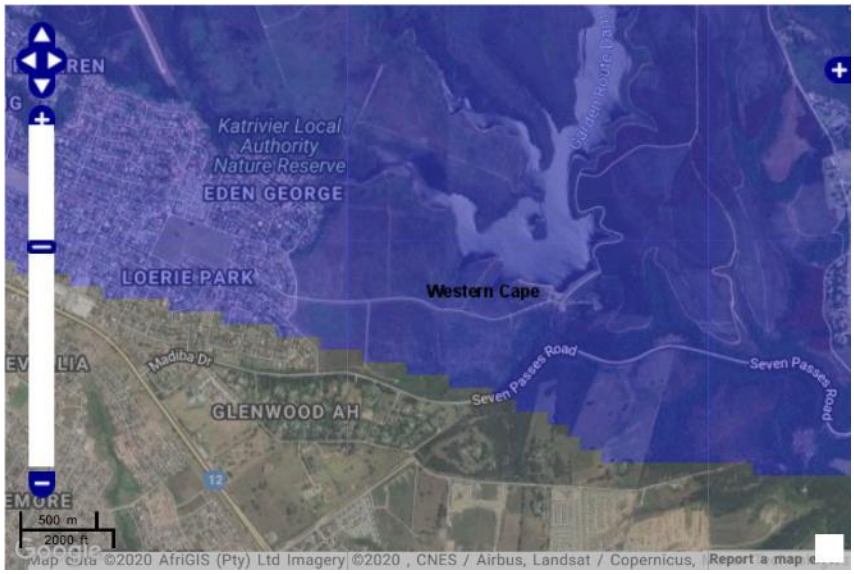


Figure 37: Paleontological Sensitivity of the Garden Route Dam area. Blue signifies Low Sensitivity (Source: SAHRIS PaleoSensitivity Mapping Tool)

A NID Application to Heritage Western Cape was compiled in terms of the National Heritage Resources Act (Act 25 of 1999) for the previous environmental authorisation process in order to confirm what studies would be required. HWC confirmed that no further study is required and the development may proceed, with no conditions.

5.3. Socio Economic Environment of George

5.3.1. Administrative Context

The study area is located in the George Local Municipality (GLM) in the south-eastern portion of the Eden District Municipality (EDM). The GLM (WC044) is a category B-Municipality and is one of seven local municipalities that make up the EDM (DC4). The George LM borders onto the Mossel Bay LM to the west, the Oudshoorn LM to the northwest, the Bitou and Knysna LMs to the southeast (all of which form part of the EDM), and, the Baviaans LM

to the northeast and Kou-Kamma LM to the east, both of which are located in the Eastern Cape Province.

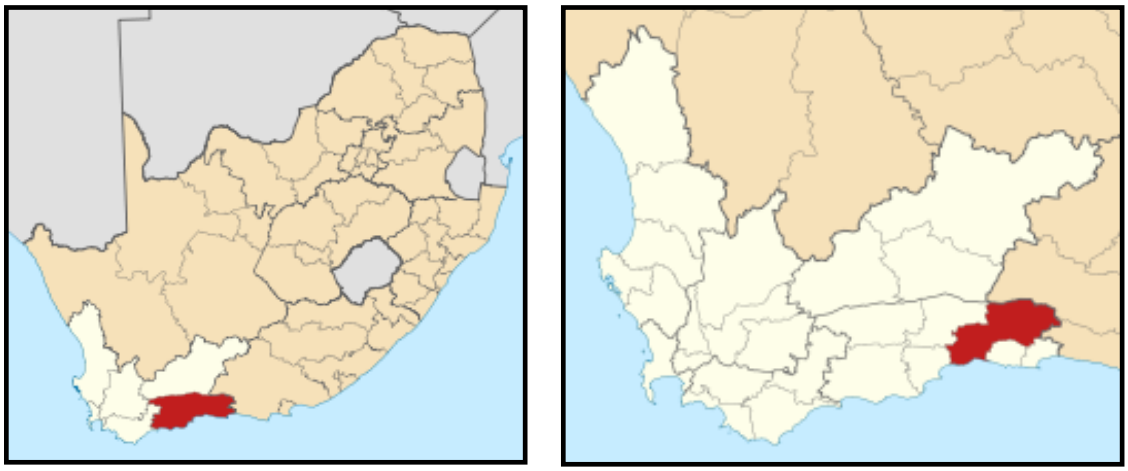


Figure 38: Location of Eden DM (left) and George LM within the Western Cape Province (source: Wikipedia)

In terms of geographic size and gross domestic product (GDP), the EDM the third largest district economy in the Western Cape, after the City of Cape Town and the Cape Winelands District. The city of George is the administrative seat of both the GLM and the EDM. As regional service centre, the Greater George urban area is the economic hub of the municipal economy, with substantial service, commercial and light industrial sectors. George (town) is situated along the N2 ("Garden route") between Cape Town (~420 km to the west) and Port Elizabeth (~330 to the east).

5.3.1.1. George

George is the sixth oldest town in South Africa, and, after the City of Cape Town, is ranked as the town with the greatest development potential in the Western Cape Province (WCP) (George LM, 2013). As indicated above, the town is the regional hub for the Southern Cape region. The town of George, as distinct from Blanco, is located to the north of the N2 ~8.5 km east of the study area. The large predominantly Coloured and Black townships of Pacaltsdorp and Thembalethu respectively are located to the south of the N2.

George evolved from a DEIC timber post established in 1776 to exploit the timber resources of what was then known as "Outeniqualand" in reference to the pastoralist Outeniqua Khoi-Khoi whose ancestral land it comprised. Increasing accessibility attracted woodcutters to settle in the area, and by 1811 George was proclaimed as a town (named after George III). The town gained municipal status in 1837. The utilization of the forest trees led to such industries as furniture and wagon making. By 1910 several large sawmills had been established in the district. Timber for export was transported to coastal ports by ox wagon. The opening of the Montagu pass (1849), a railway line (1913) and the N12 (Outeniqua pass) in 1951 have progressively provided direct abscess to the interior beyond the coastal range (i.e. Outeniqua Mountains).

Today George is modern city with sophisticated infrastructure, which includes banks, conference facilities, businesses and shopping centers. However, the town still retains its small town atmosphere. The town and surrounding area is also well-known for its world-class golf courses, including Fancourt, George Golf Course and Oubaai. The town does not have direct access to the beach, but nearby beaches include Victoria Bay (9km east of central George), Herolds Bay (18km southwest of the George city centre), and Wilderness (south-east of George).

Although urban George accommodates 82% of the municipality's population, it does not function as a fully integrated town but as an agglomeration of fragmented urban areas that reflect the legacy of apartheid spatial

planning. As a result there are significant disparities in living conditions within the Greater George urban area.

5.3.2. Demographic

5.3.1.2. Population

Barbour explains that, based on 2016 Community Survey, the population of the GLM was 208 238, which made up ~ 34 % of the population of the Eden DM (611 279) and less than 10% of the population of the Western Cape (6 279 731). According to the Department of Social Development, the population in 2018 was estimated to be 213 189. This is expected to increase to 236 655 by 2024, which equates to a 1.8 % average annual growth over this period.

The majority of the population was Coloured (49.9%), followed by Black African (30.2%), and Whites (19.6%). The dominant language within the Municipality is Afrikaans (~63.3%), followed by isiXhosa (~26.9%) and English (~6.6%)(2016 Community Survey).

The total number of households in 2016 was 62 723, which makes up 33% of the total number of households in the Eden DM. Of this total 85.2% were formal, a marginal decrease of 0.7% from 2011. Therefore, despite the increase in population there has been a decrease in the number of informal dwellings. Of the total number of households, 35.2 % were headed up by women. This represents a significant number of households that are potentially headed up by vulnerable members of the community.

In terms of age structure, 33.1% of the population were younger than 18, while 60.6% were between the age of 18 and 64, which typically falls within the economically active age group. The remaining 6.3% were in the 65 and older age group (Census 2016). The figures for 2019 are estimated to be 25% (0-14), 65 % (15-64) and 10% (over 65). The increase in the number of number of people in the over 65 age group highlights the growing attraction of the area as a retirement destination.

Dependency ratio

George's dependency ratios are expected to remain relatively stable from 48.6 in 2011 to 48.9 in 2017 before slightly decreasing to 47.6 by 2023. As lower dependency ratios imply less strain on the working age to support their economic dependents (children and aged), this decrease will have positive social, economic and labour market implications.

An increase in the dependency ratio is often associated with a relative decrease in the working age population. From a national perspective, the relative decrease in the working age population will result in lower tax revenues, pension shortfalls and overall inequality as citizens struggle to tend to the needs of their dependents amidst increased economic hardship. At the municipal level, the decrease in the working population will potentially result in a smaller base from which local authorities can collect revenue for basic services rendered and will necessitate the prioritisation of municipal spending.

Table 16: Dependency ratio George Municipality

Year	Children: 0 – 14 Years	Working Age: 15 – 65 Years	Aged: 65 +	Dependency Ratio
2011	50 953	130 348	12 371	48.6
2017	53 020	140 780	15 781	48.9
2023	52 972	151 789	19 334	47.6

(Source: George LM IDP 2017-2022)

Household income

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of

the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month (R 38 400 per annum) for an average sized household.

Based on this measure, in the region of 52.3 % of the households in the GLM live close to or below the poverty line. Of this total 12.5% of households indicated that they had no form of formal income (Tabl2 3.2). The total is slightly lower than the figures for the Eden DM, which were 55% and 13.6% respectively. The low-income levels for both the GLM and Eden DM reflect the limited formal employment opportunities in the both areas the dependence on the seasonal tourism and agricultural sector.

The low income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low income levels also result in reduced spending in the local economy and less tax and rates revenue for the district and local municipality.

Table 17: Annual household income for George and Eden Municipalities

Column	George		Eden	
R0	12.5%	6,971	13.6%	23,131
Under R4800	2.6%	1,446	2.8%	4,767
R5k - R10k	4.4%	2,423	4.4%	7,408
R10k - R20k	13.3%	7,417	14.3%	24,281
R20k - R40k	19.5%	10,884	19.9%	33,860
R40k - R75k	17.2%	9,563	16.9%	28,730
R75k - R150k	12.6%	6,993	12%	20,320
R150k - R300k	9.7%	5,394	9%	15,203
R300k - R600k	5.9%	3,296	5%	8,433
R600k - R1.2M	1.6%	895	1.4%	2,400
R1.2M - R2.5M	0.5%	253	0.4%	743
Over R2.5M	0.3%	156	0.3%	528

(Source, 2016 Community Survey)

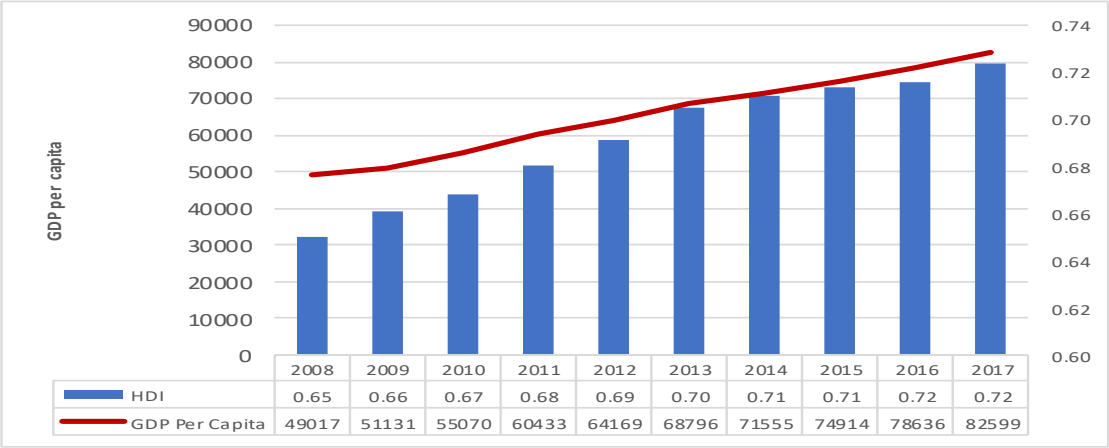
Poverty

The poverty headcount indicates that the number of poor people within the George LM decreased from 3.3% cent of the population in 2011 to 1.5% in 2016. Linked to the decrease in the number of poor people the GLM experienced a significant decrease in the number of indigents (6 120) between 2014 and 2015, which also implies a reduced burden on municipal resources.

The decrease represents a positive socio-economic indicator and should translate into less strain on municipal financial resources. The IDP also notes that the intensity of poverty, i.e. the proportion of poor people that are below the poverty line within the George municipal area, decreased from 42.6 per cent in 2011 to 40.4 per cent in 2016. However, this percentage is still high and should be moving towards zero as income of more households within the George municipal area moves away from the poverty line.

In terms of inequality, the target set by the National Development Plan (NDP) it to reduce income inequality in South Africa from a Gini coefficient of 0.7 in 2010 to 0.6 by 2030. Although income inequality in the George municipal area has decreased between 2008 and 2011, it has increased since 2012, reaching 0.61 in 2017. George's income inequality level in 2017 is similar to the 2017 average for the Garden Route District and the Western Cape Province.

The United Nations uses the Human Development Index (HDI)[1] to assess the relative level of socio-economic development in countries. The indicators used to measure human development include education, housing, access to basic services and health indicators. George recorded an HDI level of 0.723 in 2017 compared to 0.716 in 2016. As indicated in below, there has been a steady improvement in the HDI within the George municipal area, increasing from 0.65 in 2008 to 0.723 in 2017.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HDI	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.71	0.72	0.72
GDP Per Capita	49017	51131	55070	60433	64169	68796	71555	74914	78636	82599

Figure 39: HDI index trend for George Municipality (Source: Global Insight, 2017)

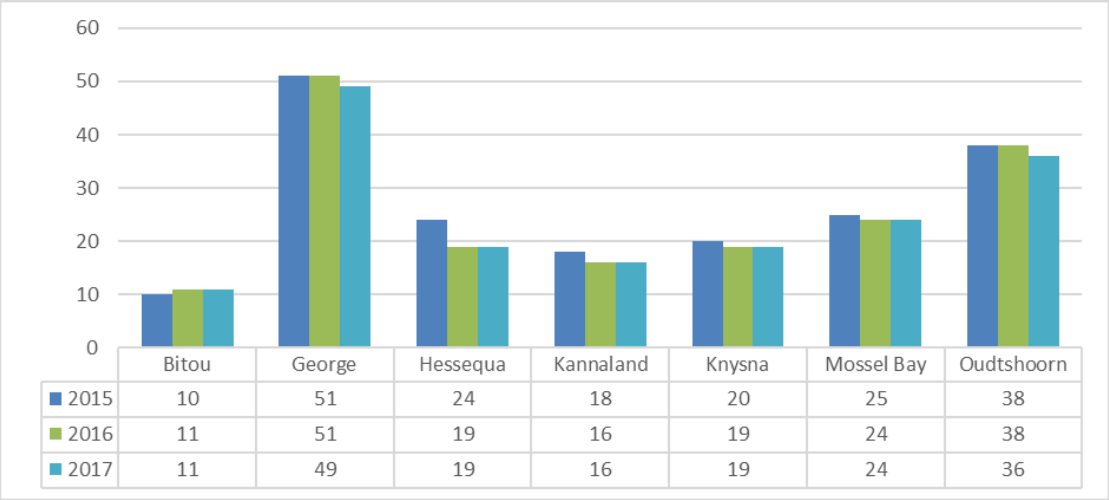
Education and educational facilities

The matric pass rates in the GLM have remained consistently above 80 % between 2013 and 2015, with the highest pass rate of 89.2 % recorded in 2013. The rate however declined to 81.9 and 84.6 % respectively in 2014 and 2015.

Of relevance to the proposed development, the IDP notes that the availability of adequate education facilities such as schools, FET colleges and schools equipped with libraries and media centres could affect academic outcomes positively. In 2015 there were 51 schools within George which had to accommodate 34 460 learners at the start of 2015. Due the tough economic conditions, schools in George have reported an increase in parents being unable to pay their school fees. Despite this, the proportion of no-fee schools has remained at 70.6% between 2014 and 2015. The number of schools equipped with libraries also remained unchanged between 2014 and 2015, namely 30.

In 2017, the George municipal area had a total of 49 public ordinary schools; 2 less than in 2016.

[1] The HDI is a composite indicator reflecting education levels, health, and income. It is a measure of peoples' ability to live a long and healthy life, to communicate, participate in the community and to have sufficient means to be able to afford a decent living. The HDI is represented by a number between 0 and 1, where 1 indicates a high level of human development and 0 represents no human development.



	Bitou	George	Hessequa	Kannaland	Knysna	Mossel Bay	Oudtshoorn
2015	10	51	24	18	20	25	38
2016	11	51	19	16	19	24	38
2017	11	49	19	16	19	24	36

Figure 40: Number of schools in each local Municipality of the Eden District from 2015-2017

Healthcare facilities

The Eden DM and George LM have a range of primary healthcare facilities which includes 35 fixed clinics, 35 mobile/satellite clinics, 6 community day centres and 6 district hospitals. Of these facilities, 10 fixed clinics, 6 mobile/satellite clinics and 1 district hospital are situated within the George LM . The George LM is also equipped with 8 emergency ambulances, which equates to 0.36 ambulances per 10 000 population, which is lower than the District average of 0.64.

5.3.1.3. Economic Activity

The George economy is made up of three main sectors, namely the primary, secondary and tertiary sectors.

Primary sector

The primary sectors consist of agriculture, forestry and fishing and contributed 4.5% (R535.9 million) towards the Municipality's GDPR in 2015. The sector recorded modest growth of 2.2% for the period 2005 to 2015. However, the sector experienced a contraction of 0.5% between 2010 and 2015.

In terms of employment the Agriculture, forestry and fishing sector employed 9.0% of the municipality's workforce. However, the contribution to employment has declined by 2.1% on average per annum over the period 2005 to 2015.

The labour force in the primary sector is characterised by a relatively large proportion of low-skilled labour. In this regard majority (54.9%) fall within the low-skill sector, which has experienced a contraction of 2.9% since 2005. The semi-skilled (39.4% of the workforce employed in the sector) contracted at a rate of 2.3% per annum since 2005. The skilled sector employs the smallest proportion of the industry's workforce (5.7%) and has shown robust growth post-recession (5.4% per annum), with a 0.6% per annum contraction over the long term (2005 – 2015). The informal sector makes up 16.2% of the sectors workforce and was the only sector to experience long term growth (albeit marginal) as employment grew by 1.3% per annum over the period 2005 – 2015.

Secondary sector

Manufacturing

The manufacturing industry made up 14.2 % (R1.676 billion) of the George LM GDPR in 2015. The industry also experienced growth of 3.3% per annum on average over the period 2005 – 2015. The sector employed 8.7% of the Municipality's workforce. However, despite the annual growth in the sector, employment contracted by 0.2% per annum over the period 2005 – 2015. Employment has however remained at a similar level in the post-recessionary period following the financial crisis in 2008.

The majority of workers are classified as semi-skilled (39.7%), followed by low-skilled (23.6%) and skilled (22.5%). 14.2% of the workforce operate within the informal sector. This sector has experienced meaningful employment growth in the post-recessionary period at 2.3%.

Construction

The construction industry contributed 4.2% (R497.8 million) towards the Municipality's GDPR in 2015, making it the fifth largest sector in the region. The sector has experienced robust growth since 2005, with growth averaging 4.7% per annum. Despite this GDP growth has nevertheless slowed since the recession and grew by 0.6 % over the period 2010 – 2015. The industry employed 7.7% of the Municipality's workforce in 2015.

Employment in the industry increased by 2.5% per annum since 2005. However, this has declined to 1.3% per annum over the period 2010 – 2015. The majority of the workers (50%) employed in the construction industry operate within the informal sector. Employment growth within this sector has been consistently high since 2005 (7.9 per cent). In terms of categories, 14.3% fall within the low-skilled employment category, semi-skilled employment makes up 27.4 % of the workforce, while the remaining 8.2% are skilled.

Tertiary sector

Commercial Services

Commercial services encompass the wholesale and retail trade, catering and accommodation, transport, storage and communication and finance, insurance, real estate & business services industries. This sector was the largest contributor (60.2% or R7.144 billion) to the Municipality's GDPR in 2015 (the largest sector in the region). The industry grew at 4.9% per annum over the period 2005 to 2015, compared to the overall municipal average of 3.9 per cent. This dropped to 4.0% in the post-recessionary period 2010-2015.

The sector is also the largest employer, with 51.8% of the Municipality's workforce. Employment has shown moderate growth throughout the past decade recording a 3.9% growth rate per annum. This has however dropped to 2.5% per annum over the period 2010 – 2015. A large proportion (29.3%) of the industry's workforce fall within the semi-skilled category, followed by 23.3% that are skilled and 11.0% are low-skilled. Informal employment within the Commercial services industry makes up 36.4% of the industries workforce and has experienced robust growth of 10.7% per annum since 2005, and lower but still strong growth of 4.7% per annum over the last 5 years.

Government and Community, Social and Personal Services

The general government and community, social and personal services sector is relatively small, and contributes only 14.5% (R1.714 billion) towards the Municipality's GDPR in 2015. The industry experienced GDPR growth of 2.5% per annum over the period 2005 – 2015 and a marginally decreased to a rate of 2.0% per annum since 2010. Despite the relatively small contribution to GDPR, the industry employs 22.4% of the Municipality's workforce. Employment growth over the period 2005 – 2015 averaged 2.6% per annum. This has dropped to 1.8% per annum for the period 2010-2015. The majority (30.1%) of the industry's workforce are classified as low-skilled, while 22.3% are semi-skilled, and 28% are classified as skilled. The informal sector employed only 19.6% of the industries workforce, but grew at a rate of 15.6% per annum over the period 2005 – 2015.

6. ALTERNATIVES

"Alternatives", in relation to a proposed activity, means different means of meeting the general purposes and requirements of the activity, which may include alternatives to –

(a) the property on which, or location where, it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;

(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

6.1. Description of the Process Followed to Reach the Preferred Alternative

6.1.1. Development Site Location and Layout Alternative

6.1.1.1. Process to Reach Preferred Alternative Location & Layout

The site layout plan shown in the figure below (and in **Appendix C2**) is the first layout option that was proposed. The social amenities and facilities provided for on the layout plan were specifically provided according to the guidelines in the Development Parameters for the provision of facilities within settlements in the Western Cape. This location was chosen as an ideal location because it is located within the George Urban Edge and has been specifically set aside and planned for development in various Municipal Planning Frameworks, including the SDF and IDP.

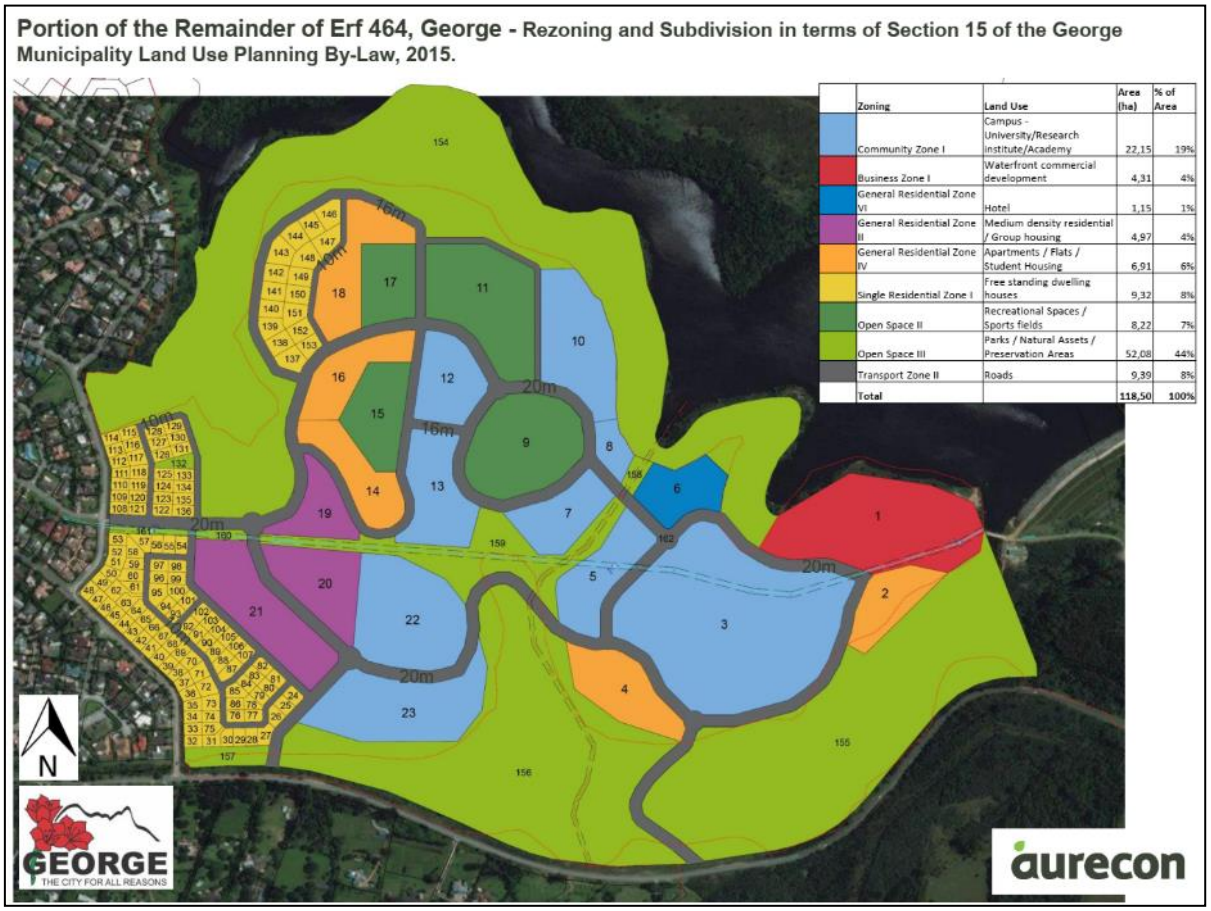


Figure 41: Original Conceptual Site Layout Plan (Alternative 1) as per Appendix C2.

After various feasibility studies, socio-economic analyses, stakeholder workshops and site visits with a range of specialists, a revised Site Layout Plan (**Appendix C1**) was then designed taking into account the recommendations made with regards to the visual impact on the surrounding area and the ecological constraints with regards to aquatic buffer zones and vegetation corridors.

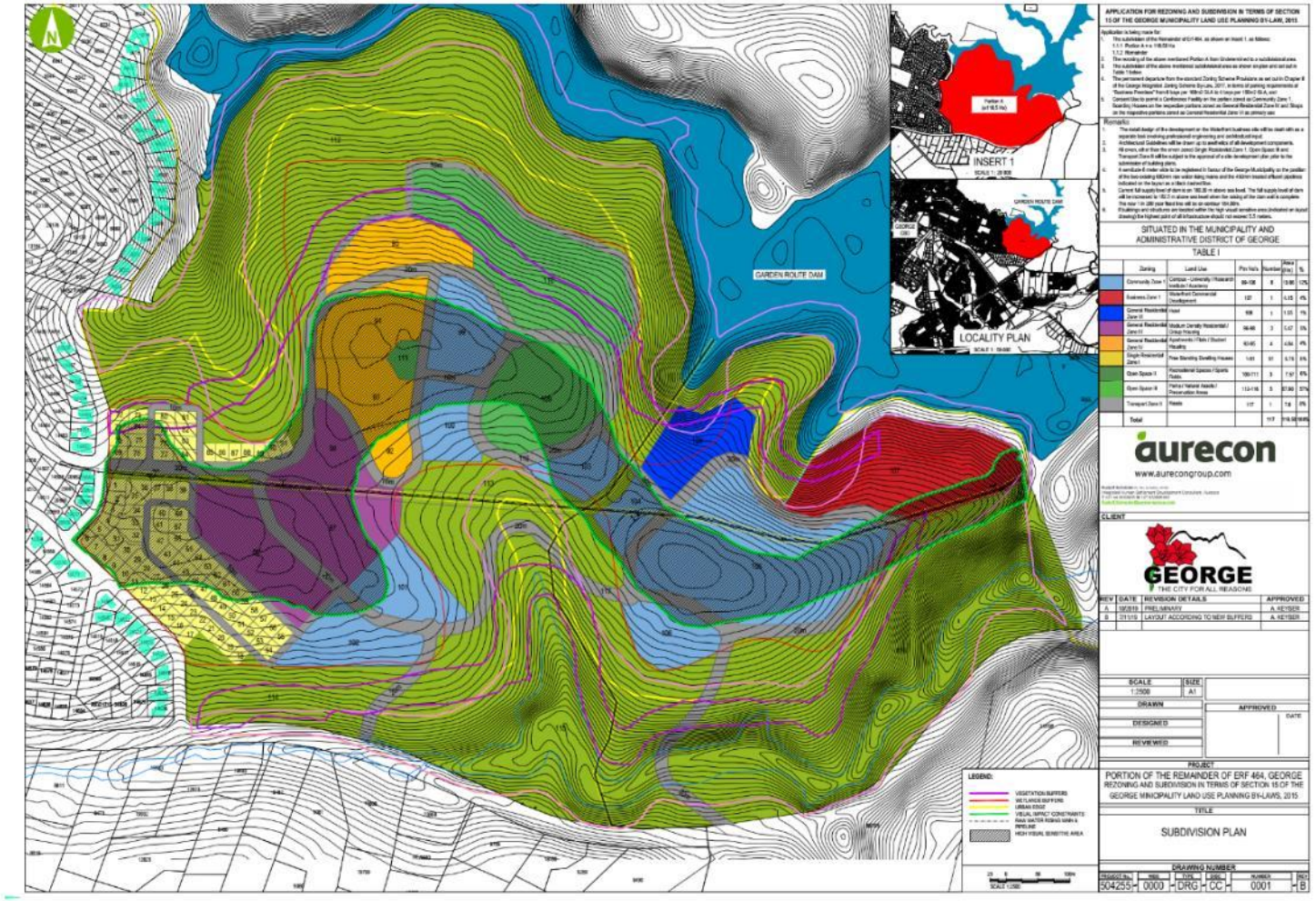


Figure 42: Revised Conceptual Site Layout Plan (Alternative 2) showing visual and biological constraints as per Appendix C1.

6.2. Concluding Statement Regarding Alternatives

The two layout alternatives discussed in Section 6.1 will be assessed against the No-Go Alternative.

Table 17 below identifies the site layout differences between the two layout Alternatives

Table 18: Summary of Alternatives Assessed

Development Proposed	No.	Size (ha)	%	No.	Size (ha)	%
	ALTERNATIVE 1			ALTERNATIVE 2		
Community Zone 1: Campus – University / Research Institute / Academy	9	22.15	19%	8	13.66	12%
Business Zone 1: Waterfront Commercial Development	1	4.31	4%	1	4.66	4%
General Residential Zone 6: Hotel	1	1.15	1%	1	1.55	1
General Residential Zone 3: Medium Density Residential / Group Housing	3	4.97	4%	3	5.47	5%
General Residential Zone 4: Apartments / Flats / Student Housing	5	6.91	6%	4	4.84	4%
Single Residential Zone 1: Free Standing Dwelling Houses	126	9.32	8%	91	5.76	5%
Open Space Zone 2: Recreation Spaces / Sports Fields	4	8.22	7%	3	7.57	6%
Open Space Zone 3: Parks / Natural Assets / Preservation Areas	9	52.08	44%	5	67.39	57%
Transport Zone 2: Roads	1	9.39	8%	1	7.60	6%
TOTAL DEVELOPMENT FOOTPRINT		118.5	100%		118.5	100%

In addition to the differences in the number of residential units and sizes of the land uses proposed, Alternative 2 has revised road layouts and placement of the land uses, taking into consideration the mapped ecological constraints and the visual impact on the scenic routes.

6.2.1. No-Go Alternative

The "No Go" alternative is the option of not developing the proposed development and associated infrastructure. This Alternative would, however, include the development of the Waterfront and Hotel, as these have been approved in a previous environmental process.

The no-development option would result in a lost opportunity in terms of the employment opportunities associated with the construction and operation phase as well as the benefits associated with the provision of a tertiary education facility, residences and social facilities. The "no-go" alternative will result in the visual environment staying mostly the same with the natural character of the area contributing to the "sense of place".

The socio-economic benefits of this project however outweigh the impacts in an area which is mostly disturbed and planned for development purposes in the Municipal SDF (within the urban edge).

7. PUBLIC PARTICIPATION PROCESS

7.1. Public Participation Rounds 1&2: Opportunity for Registration and Public & Authority Review of the Draft Scoping Report

It is a requirement according to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, as amended, that once an application is submitted to obtain an Environmental Authorisation in terms of the NEMA EIA Regulations, that potential or registered Interested and/or Affected Parties (interested in the proposed development or affected by the proposed development) are subjected to a consultation period (at least 30 days) on the Draft Scoping Report before their comments are taken into account and responded to in a Final Scoping Report which is then submitted for decision making.

The **Pre-Application Draft Scoping Report** (first round of Public & Authority Consultation) was made available to identified Potential Interested & Affected Parties **19 June 2020 – 20 July 2020 (30+ days).** An electronic version of the report was placed on the SES website to be accessed by the public. Based on requests by Stakeholders, the commenting period for the Pre-Application Draft Scoping Report (DSR) was extended until **21 August 2020**.

Following the Pre-Application public participation period, an Application form was completed and submitted to the Department of Environmental Affairs and Development Planning (DEA&DP).

As per the legislated process, the Pre-Application Draft Scoping Report was revised based on comments received and the Post-Application Draft Scoping Report made available to identified Potential Interested & Affected Parties and Automatically Registered Key Authorities from **16 April 2021 – 17 May 2021** (30 days) to review in order to provide comment.

Please note that all comments submitted to SES in writing on the Draft Scoping Report have been responded to in the Comments & Response Reports. All those that submitted comment were automatically registered on the database and will be notified for the remainder of the EIA process of all reports available for review and comment.

Following the second round of public participation, the Post-Application Draft Scoping Report was finalised and submitted to DEA&DP for consideration (Acceptance/Rejection). Acceptance was received from DEA&DP on 27 June 2020.

7.1.1. Register of Interested & Affected Parties

A desktop assessment was undertaken in order to ascertain the erven and farm numbers of the adjacent affected landowners & occupiers. In addition, the list of I&APs from the previous environmental authorisation process was consulted and relevant contacts included onto the register.

Key Authorities (automatically must be registered) and other key stakeholders have also been identified and placed on the Register. In addition, all those that provided comment during the Pre and Post-Application Public Participation phase have been included onto the register.

7.1.2. Landowner Consent

It is a requirement in terms of the NEMA EIA Regulations of 2014, as amended, to obtain Landowner Consent for non-linear developments. The property is owned by the applicant therefore consent is not required.

7.1.3. Site Notice

Site notices, in English, were placed at the proposed entrances to the development site, notifying potential Interested and Affected Parties (I & AP's) of the availability of the Pre-Application Draft Scoping Report and inviting I & AP's to register on the database as Registered Interested & Affected Parties. Please refer to Appendix E3 for the content of the site notice and proof of placement.

7.1.4. Newspaper Advertisements & Articles

A newspaper advertisement, in English and Afrikaans, was placed in the local newspaper (George Herold) on 18 June 2020, notifying potential Interested and Affected Parties (I & AP's) of the availability of the Pre-Application Draft Scoping Report and inviting I & AP's to register on the database as Registered Interested & Affected Parties. Please refer to Appendix E4 for the content of the newspaper and proof of placement.

Several newspaper articles regarding the proposed development were subsequently published in the George Herald and the Sunday Times. Please refer to Appendix E4 for the content of these newspaper articles.

7.1.5. External Circulation of Information

The public participation for the proposed development became much more than what is prescribed. There have been online petitions and whatsapp groups discussing the proposal and in one instance, we believe there were over 12 000 signatures opposing the proposal. It should, however, be noted that most of the I&APs who signed the petition have not read all of the available documentation and many did not fully understand the proposal.

Due to the ease of access to such petitions (being available on the phone at the touch of a button) and the limited information provided by the petitioner, the value of these signatures is questionable. In addition, the petition and its signatories was not formally circulated to the EAP's or the Applicant for consideration.

7.2. Summary of Key Issues Raised by I & AP's during Rounds 1 & 2

To view all comments received in writing during the first two phases of public participation (Pre-Application and Post-Application Scoping Phases) please refer to **APPENDIX E** (comments received on the Draft Scoping Report before Final Scoping Report was submitted). In summary, the Key Issues raised in the "Scoping Phase" were as follows:

- Layout Design Concerns:
    - Access for cyclists / runners to the trails and canoeists to the dam
    - Misconception that the development is proposing low-cost housing
- Need & Desirability Concerns:
    - Need for a new University at this site & Viability Post-Covid 19
    - Type of Education proposed at the University
- Socio-Economic Concerns:
    - Negative Social impacts relating to Students (Noise, drunkenness, car racing, littering, protesting etc.)
    - Property Price impacts
    - Traffic
- Biological Concerns:
    - Loss of Natural Area and Beauty
    - Potential pollution of the dam and the water resource
    - Littering
- Technical Concerns:
    - Public Participation during Covid-19 lockdown

Please refer to the **Comments and Response Report** to view the detailed response to each comment received.

7.3. Public Participation Round 3: Opportunity for Public & Authority Review of the Draft Environmental Impact Assessment Report

The Draft Environmental Impact Assessment Report (third round of Public & Authority Consultation) is being made available to registered Interested & Affected Parties and Registered Key Authorities to review in order to provide comment on from the **October 2021 – November 2021** (30 days). The Draft Report has been posted or hand delivered in hardcopy to Key Authorities and made available for free download and review directly from our website (www.sescc.net) under the public documents tab. The Report was also available in hardcopy at the George Public Library.

8. IMPACTS

8.1. Summary of Impacts Identified

The impact tables in the section below include the identified potential environmental impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of impact, the degree to which the impact can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.

These impact tables have been informed by the Agricultural Compliance Statement, Aquatic Impact Assessment, Biodiversity Impact Assessment, Butterfly Survey, HWC Response, Socio-Economic Impact Assessment, Stormwater Management Plan, Traffic Impact Assessment, Urban Design Report and Visual Impact Assessment**.**

8.1.1. Screening Tool Results

The Department of Environmental Affairs (DEA) has developed a screening tool for an Environmental Authorization which identifies potential environmental sensitivities on the proposed site. The results of the tool can be found in **Appendix E**. Table 18 shows the findings of the tool:

Table 19: Results of the DEA Screening Tool for the Development Footprint of the Proposed University Precinct at Garden Route Dam (Dated 21/09/2021)

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVITY
Agriculture		X		
Animal Species		X		
Aquatic Biodiversity	X			
Archaeological and Cultural Heritage	X			
Civil Aviation		X		
Paleontology				X
Plant Species		X		
Terrestrial Biodiversity	X			

Based on these results, the Screening tool recommended the following specialist assessments be conducted:

- Landscape / Visual Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Paleontology Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment
- Avian Impact Assessment
- Socio-Economic Assessment

- Plant Species Assessment
- Animal Species Assessment

In response to these recommendations, the following studies were compiled for the proposed development, which is felt addresses all of the potential impact concerns:

- Agricultural Compliance Statement,
- Aquatic Impact Assessment,
- Biodiversity Impact Assessment,
- Butterfly Survey,
- Socio-Economic Impact Assessment,
- Stormwater Management Plan,
- Traffic Impact Assessment,
- Urban Design Report and
- Visual Impact Assessment

An avian impact assessment is included into the Biodiversity Impact Assessment.

A comment regarding the potential Heritage Resources on the site has been provided from Heritage Western Cape (see **Appendix L4**), wherein they note that the proposed development will not impact on heritage resources and therefore no further action is required. Heritage Impacts have, therefore, not been further investigated.

8.2. Potential Environmental Impacts Identified

8.2.1. Construction Phase

The following potential environmental impacts have been identified by the EAP and the appointed specialists as impacts that may occur during the construction phase that need to firstly be avoided and if unavoidable, mitigated to an acceptable level of impact significance.

- **Agricultural Potential Impact - Loss of agricultural land** that has the potential to be used for cultivation of crops or other agricultural purposes (opportunity cost).
- **Botanical Impact - Permanent or temporary loss of vegetation cover as a result of site clearing:** Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.
- **Botanical Impact - Loss of Species of Conservation Concern during pre-construction site clearing activities:** A number of Species of Conservation Concern are present within the affected area, which may be destroyed during site preparation if there is no effective management and control of the construction process.
- **Botanical Impact - Susceptibility of some areas to erosion as a result of construction related disturbance:** Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
- **Dust & Noise Impact:** Limited dust and noise impacts may result due to construction activities on the site. Excavations and associated earth-moving activities may generate noise and vibration which may pose a nuisance to surrounding residents and other land users. Movement of heavy vehicles to & from the site may generate noise, which may affect surrounding residents.
- **Faunal Impact - Loss of Faunal Habitat:** Activity will result in the loss of habitat for faunal species.
- **Faunal Impact - Loss of faunal species due to construction activities:** Activities associated with bush clearing and killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.
- **Freshwater Resources Impact – Disturbance/Loss of aquatic vegetation and habitat:** The project will require the majority of vegetation on the property to be cleared resulting in land cover changes in the

catchments. The machinery, vehicles and workers (i.e. turning areas and crossings) needed to construct the roads and stormwater infrastructure will transform areas of riparian habitat. The remaining wetland habitat on the Klein Swart watercourse may, if construction is not strictly controlled, be either replaced or at least compromised by the construction of infrastructure.

- **Freshwater Resources Impact – Erosion of the banks and sedimentation of the watercourses:** Vegetation clearing and exposure of bare soils within and upslope of the aquatic habitat during construction will decrease the soil binding capacity and cohesion of the upslope soils and thus increase the risk of erosion and sedimentation downslope. This may cause the burying of aquatic habitat and also cause aquatic faunal fatalities. It may lead to the wetland ceasing to function. Ineffective site stormwater management, particularly in periods of high runoff, can lead to soil erosion from confined flows. Formation of rills and gullies from increased concentrated runoff. This increase in volume and velocity of runoff increases the particle carrying capacity of the water flowing over the surface. If this is allowed to occur, it is likely to be one of the most significant impacts upon the wetland. Any development on the steeply sloped areas, including roads, magnifies the potential for the watercourses to be impacted upon.
- **Freshwater Resources Impact – Water Pollution:** During construction there are a number of potential pollution inputs into the aquatic systems (such as hydrocarbons and raw cement). These pollutants alter the water quality parameters such as turbidity, nutrient levels, chemical oxygen demand and pH.
- **Heritage Impact:** The loss of Heritage resources, including Archaeological and Paleontological: Due to land clearing and excavations on the site.
- **Pollution & Contamination of Soil and Water Resources:** Construction activities will generate waste. In addition, fuel, oil, lubricants and other pollutants may leak from vehicles/ machinery and contaminate the soil. Pollution and soil contamination could also occur from chemical toilets, cement mixing directly on the soil and storm water runoff may flow over the site camp area and carry contaminants off-site.
- **Socio-Economic Impact – Creation of business and employment opportunities:** The majority of work during the construction phase is likely to be undertaken by local contractors and builders. The proposed development will therefore represent a positive benefit for the local construction and building sector in the Eden District Municipality (EDM) and George Local Municipality (GLM). The majority of the building materials associated with the construction phase will be sourced from locally based suppliers from the EDM and GLM. A significant portion of the annual wage bill will be spent in the local EDM and GLM. The long term economic impacts will be massive given the scale and duration of the proposed development. Most of the labour will be made up of Historically Disadvantaged Individuals (HIDs).
- **Traffic & Safety Impact:** It is proposed to deliver a significant amount of materials and equipment to the site during the construction phase of the development. Numerous truck trips will be required every day that could cause a temporary disturbance to traffic in the area. Impacts are expected to occur to the traffic in the area due to increased truck and construction vehicle traffic expected during the construction phase. Construction vehicles may impact on the existing road conditions (road capacity and congestion). Vehicles may impact on road safety conditions due to an increase in construction phase vehicles entering and exiting the site and they may impact on the condition of the existing road network.
- **Visual Impact:** The construction phase is associated with temporary disturbance as a result of construction (trench excavations, vehicles, machinery, fencing & signage) that may have a negative visual impact to the area.

8.2.2. Operation Phase

- **Botanical Impact - invasion by exotic and alien species:** Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
- **Botanical Impact - Disturbances to ecological processes:** Activity may result in disturbances to ecological

processes.

- **Faunal Impact - Loss of faunal species due to operational activities**: Faunal species loss due to increased vehicle activity, noise and lighting.
- **Freshwater Resources Impact – Disturbance/Loss of aquatic vegetation and habitat:** Roads, pipelines, culverts and bridges create migration barriers to biota, resulting in reach to zone scale instream biological impacts. Localised scour around structures or flow impediments may result and alter the natural bank and channel, channel bank stability and floodplain processes. Road and pipeline crossings that concentrate diffuse flows and can also inadvertently trigger gully formation. The stormwater infrastructure of the housing and associated road network will increase and concentrate flows into the watercourses. This may lead to erosion in the systems that compromises remaining habitat. The project will promote the establishment of disturbance-tolerant biota, including colonization by invasive alien species, weeds and pioneer plants within the remaining habitat. Although this impact is initiated during the construction phase it is likely to persist into the operational phase.
- **Freshwater Resources Impact – Erosion of the banks and sedimentation of the watercourses:** Where soil erosion problems and bank stability concerns initiated during the construction phase are not timeously and adequately addressed, these can persist into the operational phase of the development project and continue to have a negative impact downstream. The increase in hardened surface by development, and the impact of road and pipe crossings will be considerable and, if not mitigated against, will result in further erosion. Surface runoff and velocities will be increased, and flows will be concentrated by stormwater infrastructure.
- **Freshwater Resources Impact – Water Pollution:** The greater the extent of hardened surfaces (e.g. roofs, parking lots etc.), the lower the infiltration of stormwater and therefore the greater the surface runoff and increase in flood peaks. A change in water distribution generally results in altered wetness regimes, which in turn affect the biophysical processes and the vegetation patterns. Urbanization of the catchment and its associated stormwater runoff is a threat to freshwater biodiversity not only because of the increased hydrological disturbance and habitat loss, but also because of an increased delivery of pollutants to streams. These pollutants often do not have a chronic effect on aquatic biota but their negative and collective effects may be realised over longer periods of time. The most problematic nutrients are nitrogen and phosphorus. Stormwater runoff from urban surfaces may include nutrients, pollutants, raw sewage and other domestic waste. The establishment of sewer pipes within and/or in close proximity to watercourses always poses a long term threat to the water quality and ecological health of freshwater ecosystems due to the relatively high likelihood that surcharge events will occur at some point in the future.
- **Freshwater Resources Impact – Flow Modification:** Hardened/artificial infrastructure will alter the natural processes of rain water infiltration and surface runoff, promoting increased volumes and velocities of storm water runoff, which can be detrimental to the rivers and wetlands receiving concentrated flows from these areas.
- **Socio-Economic Impact - Provision of Tertiary Education:** Education, especially higher education, is an investment in human capital which increases future output and the lifetime earnings of graduates. Universities lead to a more educated and higher earning workforce within a region. As such, universities and colleges have been singled out as the premier institutions for generating and maintaining a nation's professional labour force.
- **Socio-Economic Impact - Provision of Housing:** The proposed development will assist to address some of the housing backlog in the area.
- **Socio-Economic Impact - Provision of public open spaces:** The development proposal places strong emphasis on the preservation and enhancement of natural assets present on the site. This development proposal has strategically harnessed the high-quality vegetation in order to allow these natural systems to flourish and contribute to the sustainability of this proposed development. These natural areas can then be enjoyed by students and residents from the area.
- **Socio-Economic Impact - Provision of sports facilities:** The proposed development makes provision for the

establishment of various sports facilities. These components will not only contribute to an improved quality of life for many students, but also the local municipality who can make use of the facilities after hours.

- **Socio-Economic Impact - Provision of facilities to enhance the use of the dam**: The development will allow access to the dam in a controlled and structured manner. This will mean that the dam and its recreational features can be enjoyed in a safe and experience enhancing manner. Currently there are no facilities to speak of when using the dam and no structured points of access.
- **Socio-Economic Impact - Employment and business:** The campus, as well as business and commercial components will create employment opportunities for local residents. The residential component may also create some opportunities for domestic workers and gardeners etc. The majority of the employment opportunities are likely to benefit Historically Disadvantaged Individuals (HDIs). Given the high unemployment levels in the surrounding areas, coupled with the low income and education levels, this would represent a positive social impact. The operational phase will also create opportunities for local businesses, such as local maintenance and building companies, garden services and security companies, petrol stations, shops and restaurants etc. and create opportunities for new businesses to develop. The local estate agencies in the area and legal firms would also benefit from the sale and resale of properties associated with the new development.
- **Socio-Economic Impact - Broaden the rates base:** The development will result in an increase in the rates base. In addition, the proposed development would also generate revenue for the local municipality from the consumption of water and electricity.
- **Socio-Economic Impact - Property Values of surrounding landowners**: Values of real estate are driven by various factors, among others supply and demand, interest rates, the contraction or expansion of the local economy, population growth rates and changes in disposable income to debt ratios. With the increase in facilities, it is likely that surrounding properties values may increase due to their proximity.
- **Traffic & safety impact:** A significant increase in traffic is expected to occur in the area as a result of more than 865 erven and various social amenities proposed. Vehicles may impact on the existing road network and road safety conditions due to an increase in vehicles entering and exiting the site.
- **Visual Impact – Land use character & "sense of place":** It is proposed to change the land use character and existing sense of place of the site from a largely undeveloped site to a built up mixed use development of approximately 119ha. The proposed development would impact on the "sense of place" of the area to sensitive receptors that can see the development. In addition, the landscape character of the surrounding scenic routes would be compromised.
- **Visual Impact - Visual intrusion of night lighting:-** The campus and sports facilities would result in additional lighting at night, which would be visible from the surrounding landscape.

8.3. Methodology Used in Determination of the Significance of Potential Impacts

The following assessment methodology was used by the Specialists and the EAP. It has been adapted from the DEAT (2002) Information Series 5, Integrated Environmental Management Information Series on Impact Significance:

Table 20: Methodology in determining the extent, duration, probability, significance, reversibility and cumulative impact of an environmental impact.

Determination of Extent (Scale):

Site Specific	The impact is limited to the development site (development footprint) or part thereof.
Local	The impacted area includes the whole or a measurable portion of the site, but could affect the area surrounding the development, including the neighbouring

	properties and wider municipal area.
Regional	The impact would affect the broader region (e.g. neighbouring towns) beyond the boundaries of the adjacent properties.
National	The impact would affect the whole country (if applicable).

Determination of Duration:

Temporary	The impact will be limited to part of the construction phase or less than one month.
Short term	The impact will continue for the duration of the construction phase, or less than one year.
Medium term	The impact will continue for part the operational phase
Long term	The impact will continue for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact that will be non-transitory. Such impacts are regarded to be irreversible, irrespective of what mitigation is applied.

Determination of Probability:

Improbable	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
Probable	There is a possibility that the impact will occur to the extent that provisions must therefore be made.
Highly probable	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up to mitigate the activity before the activity commences.
Definite	The impact will take place regardless of any prevention plans.

Determination of Significance (without mitigation):

No significance	The impact is not substantial and does not require any mitigation action.
Low	The impact is of little importance, but may require limited mitigation.
Medium	The impact is of sufficient importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
Medium-High	The impact is of high importance and is therefore considered to have a negative impact. Mitigation is required to manage the negative impacts to acceptable levels.
High	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.
Very High	The impact is critical. Mitigation measures cannot reduce the impact to

	acceptable levels. As such the impact renders the proposal unacceptable.

Determination of Significance (with mitigation):

No significance	The impact will be mitigated to the point where it is regarded to be insubstantial.
Low	The impact will be mitigated to the point where it is of limited importance.
Medium	Notwithstanding the successful implementation of the mitigation measures, the impact will remain of significance. However, taken within the overall context of the project, such a persistent impact does not constitute a fatal flaw.
High	Mitigation of the impact is not possible on a cost-effective basis. The impact continues to be of great importance, and, taken within the overall context of the project, is considered to be a fatal flaw in the project proposal.

Determination of Reversibility:

Completely Reversible	The impact is reversible with implementation of minor mitigation measures
Partly Reversible	The impact is partly reversible but more intense mitigation measures
Barely Reversible	The impact is unlikely to be reversed even with intense mitigation measures
Irreversible	The impact is irreversible and no mitigation measures exist

Determination of Degree to which an Impact can be Mitigated:

Can be mitigated	The impact can be completely mitigated
Can be partly mitigated	The impact can be partly mitigated
Can be barely mitigated	It is possible to mitigate the impact only slightly
Not able to mitigate	It is not possible to mitigate the impacts

Determination of Loss of Resources:

No loss of resource	The impact will not result in the loss of any resources
Marginal loss of resource	The impact will result in marginal loss of resources
Significant loss of resources	The impact will result in significant loss of resources

Complete loss of resources	The impact will result in a complete loss of all resources

Determination of Cumulative Impact:

Negligible	The impact would result in negligible to no cumulative effects
Low	The impact would result in insignificant cumulative effects
Medium	The impact would result in medium cumulative effects
High	The impact would result in significant cumulative effects

Significance ratings of impacts after mitigation have been colour coded for ease of reference, as follows:

POSITIVE IMPACTS	NEGATIVE IMPACTS
High	High
Medium-High	Medium-High
Medium	Medium
Low-Medium	Low-Medium
Low	Low
Negligible	Negligible

8.4. Summary of Key Findings & Recommendations of Specialist Assessments

8.4.1. Agricultural Compliance Statement

8.4.1.1. Key Findings

- The high sensitivity attributed to the site by the screening tool is disputed by this assessment.
- High sensitivity should indicate viability for cultivated crop production. However, there are a number of factors that limit the site's potential for crop production. The fact that the land has never been used for crop production, suggests that it is unsuitable. The limiting factors are:
    - Steep slopes on some of the land
    - The fact that the land is municipally owned does not encourage its use for agricultural production.
    - The soils have limited potential for crop production. According to the land type soil data (see Appendix 1), the site is totally dominated by fairly shallow, fairly poorly drained duplex soils (having a distinct transition from a sandy topsoil to a clay rich subsoil).
- Because of these constraints, the site is not suitable for viable crop production, and is therefore assessed as being only of medium agricultural sensitivity rather than high agricultural sensitivity. High agricultural sensitivity should be reserved for land that is suitable for viable crop production.

8.4.1.2. Key Impacts Identified

- It is confirmed that, because of the limits to agricultural potential and use, the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site.

8.4.1.3. Recommended Mitigation Measures

- The entire site will be excluded from agricultural use. Therefore, the protocol requirement of confirmation that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities, is not relevant in this case.
- For the same reason, there are no Environmental Management Programme inputs required for the protection of agricultural potential on the site.

8.4.2. Botanical Impact Assessment

8.4.2.1. Key Findings

- Conservation Management Services conducted a biodiversity impact assessment on the study area in August 2019.
- Taplin (2019) explains that the study area falls within the Garden Route Shale Fynbos and Garden Route Granite Fynbos vegetation units of the Vegetation Map of South Africa, Lesotho and Swaziland (Mucina et al, 2012).
- According to the CAPE Project Broad Habitat Units of the CAPE Floristic Kingdom (Cape Nature Conservation Board, 2002 & Cowling et al., 1999), the study area falls within the Knysna Afromontane Forest broad habitat unit.
- The entire study area can be described as a highly disturbed and formerly transformed habitat. The majority of the study area was covered by a commercial pine tree plantation in the past. Only a very narrow belt along the Garden Route Dam shore, the public picnic area and the small river along the southern boundary was free of pine trees.
- The study area consists of four broad habitat types, namely:
    - Pioneer Fynbos;
    - Pioneer Thicket / Forest;
    - Highly disturbed areas with an ephemeral weed cover;
    - Wetland habitat.
- *Gladiolus fourcadei* (Critically Endangered) was discovered on the study area.
- The overall botanical impact of the proposed development layout is Medium-Low negative (before mitigation) and Low negative (after mitigation).
- The impact on the Highly sensitive *Gladiolus fourcadei* is High-Very Hih negative (before mitigation) and Medium / Medium-High negative (after mitigation).
- Provided that the recommendations in the Botanical Impact Assessment can be implemented **the proposed project presents no botanical Fatal Flaws, and will therefore have an acceptable level of botanical impact.**

8.4.2.2. Key Impacts Identified

- During construction, the main impacts would be **permanent loss of any vegetation cover and habit and, loss of species of conservation concern**.
- During operation, disturbance to the **ecological processes and invasion by exotic and alien species** may occur.

8.4.2.3. Recommended Mitigation Measures

- The areas mapped as highly-sensitive *Gladiolus fourcadei*, sensitive wetland habitat and sensitive forest thicket should, where practically possible, be retained intact. This is due to their sensitivity and their functionality as ecological corridors connecting the site to the surrounding landscape. However, where infrastructure such as roads and pipelines is required to transect these habitats to service the

development, the following recommendations are made:

Before and during construction

- A suitably qualified search-and-rescue team must search the identified area and translocate any sensitive plants or vertebrates found to a suitable location;
- A suitably qualified Environmental Control Officer (ECO) should be assigned to the development site during construction to ensure that environmental authorisation (EA) conditions are implemented and monitored;
- Suitably designed and constructed culvert bridges which will not affect the hydrology of the wetlands are recommended;

After construction

- A suitably qualified restoration specialist must be appointed to ensure these sensitive areas are restored to their pre-disturbance condition;
- The area mapped as sensitive fynbos restoration opportunity provides a restoration opportunity. It is suggested that the development layout be refined to maximize this ecological corridor opportunity where possible;
- A buffer zone of at least 40-50m should be retained intact between the proposed development and habitats listed as sensitive.
- The proposed layout in the western portion of the development (single residential) which encroaches into the area listed as sensitive wetland should be removed and the necessary buffer provided;
- The proposed layout in the eastern portion of the development (student housing) which encroaches into the area listed as sensitive forest thicket restoration opportunity should be removed and the necessary buffer provided;

Ecological corridor of undeveloped open space:

- Consideration can be given to additional open space in the centre of the development which may allow for improved fine-scale or site specific ecological functioning.
- Recommendations include a minimum ecological corridor of undeveloped open space of approximately 100-150m wide. In addition, it is recommended that a “Y-shaped” open space corridor running though the centre of the site, connecting the sensitive habitats on the peripherals, makes the most sense from a functionality perspective.
- Where practically possible, the roads and other infrastructure proposed within the sensitive southern portion of the site should be reconsidered and relocated.
- Should this not be possible, a suitably qualified search and rescue team must search the area and translocate any sensitive plants found. Where the proposed roads transect the sensitive wetland area, a suitably constructed culvert bridge which will not affect the hydrology of the wetland is required;
- All invasive alien plants must be completely removed from the entire property, and the area kept completely clear of invasive alien plants once removal has taken place.
- An appropriate fire regime must be applied to all the remaining natural areas that require periodic fire for rejuvenation;
- Only the necessary plant cover must be removed from site surfaces in preparation for construction and these areas should not be cleared long before the development of infrastructure on the site;
- Environmental compliance and monitoring is required during and after the construction phase of the development.
- A pre-construction “walk through” must be conducted with a suitably qualified botanist to identify any plant species of conservation concern located within the construction footprint and for which permits will be required prior to commencement of construction activities;
- Search-and-rescue must be conducted for plants and an onsite nursery established. A suitably qualified

person must be in charge of this nursery.

- Rescued plants need to be used in the landscape plan after development.

8.4.3. Freshwater Impact Assessment

8.4.3.1. Key Findings

- Sharples Environmental Services conducted an Aquatic Impact Assessment on the study area in September 2021.
- The study found that the proposed project is located within the Quaternary Catchment K30C of the Coastal Gouritz Water Management Area and the Southeastern Coastal Belt Ecoregion.
- The study area is located within the Outeniqua Strategic Water Source Area for Surface Water.
- The aquatic habitats within a 500 metre radius of the site were identified and mapped on a desktop level utilising available data. Following the desktop findings, the infield site assessments (conducted on the 26th of September 2018 and on the 23rd of the 7th 2020) confirmed the location and extent of these systems.
- A screening assessment identified seven aquatic habitats within a 500 m radius of the site, including the Kat River, Garden Route Dam.
- One artificial wetland was also identified.
- It was determined that the most severe potential impacts associated with the development will likely be habitat disturbance/loss due to flow modifications, erosion and sedimentation as a result of new road and pipeline crossings and increased stormwater runoff.
- The transformed land surface will promote increased volumes and velocities of storm water runoff, which can be detrimental to the watercourses receiving concentrated flows off of the area.

8.4.3.2. Key Impacts Identified

- During construction and operation, the main impacts would be **Loss and disturbance of aquatic vegetation & habitat, Erosion & Sedimentation, Flow Modification and Water Pollution.**

8.4.3.3. Recommended Mitigation Measures

- Buffer Zones
  - The aquatic buffer areas should be treated as No-Go zones for development and all associated infrastructure should be set back (apart from road crossings which cannot avoid the buffer areas).
  - The boundary of the buffer area should be restricted to low conflict land uses, such as essential services (stormwater outlets) and recreational areas (cycling tracks).
  - Monitoring implementation and management of the final buffer areas should be undertaken throughout the duration of construction activities to ensure that the effectiveness of the final buffer zone areas is maintained, and that management measures are appropriately implemented.
  - Regular inspections during the operational phase should also be undertaken to ensure that functions are not undermined by inappropriate activities. It is also recommended that a stormwater management plan be developed to maintain or mimic the natural runoff as well as prevent the wash-off of pollutants to receiving waters.
- Design / Pre-Construction
  - The mitigation of impacts must focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment. The stormwater flows must enter the wetland areas in a diffuse flow pattern without pollutants.
  - When developing a stormwater management plan for the site, it will be critical that due consideration is given to the collection and treatment of stormwater prior to discharge into the natural environment.

It is therefore recommended that the stormwater management plan be developed with appropriate ecological input and be developed based on Sustainable Drainage Systems (SUDS). The SUDS systems attempt to maintain or mimic the natural flow systems as well as prevent the wash-off of urban pollutants to receiving waters.

- To achieve these objectives a detailed Stormwater Management Plan (SWMP) must be prepared at detailed design stage for approval.
- Soft infrastructure must be considered where practical. For example, permeable surfaces can be done via permeable concrete block pavers (such as Amorflex), brick pavers, stone chip, and gravel and may contribute to slowing surface flows (especially if maintained). Baffles in the stormwater conduits are effective. Stormwater managed by the development could be discharged into porous channels / swales ('infiltration channels or basins') running near parallel or parallel to contours within and along the edge of the development.
- This will provide for some filtration and removal of urban pollutants (e.g. oils and hydrocarbons), provide some attenuation by increasing the time runoff takes to reach low points, and reduce the energy of storm water flows within the stormwater system through increased roughness when compared with pipes and concrete V-drains.
- Should residual impacts still be anticipated after most stormwater mitigation measures have been considered, it may be necessary to investigate large scale measures, such as an infiltration berm/ trench/swale (along the contour) directly upslope of the riparian zone of the dam.
- Frequent, multiple stormwater outlets must be designed to prevent erosion at discharge points. Outlets should be in the form of multiple smaller storm water outlets rather than a few large outlets in order spread out surface flow and avoid flow concentration and erosion as far as possible On the steeper sections of the housing and road networks, it is recommended that the frequency of stormwater outlets is increased to prevent erosion at discharge points.
- All erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural slope of the surface and located at the natural ground level. Structures such as these must be located within the layout footprint and not encroach into the buffer areas.
- Stormwater exit points must include a best management practice approach to trap any additional suspended solids and pollutants originating from the proposed development. Also include the placement of stormwater grates (or similar).
- The use of grease traps/oil separators to prevent pollutants from entering the environment from stormwater is recommended. To ensure the efficiency of these, they must be regularly maintained.
- For parking lots and driveways - garden beds (landscaped areas) and storm water conveyance channels, the use of concave open-lined swales or bio-retention areas should be used to receive and convey storm water. For these areas no curbs or spaced curbs are recommended so water can move freely from hardened surfaces into the swales or bioretention areas.
- Equally, if flower/plant beds are to be established adjacent to paved surfaces, then these should be designed to receive storm water from hardened surfaces and should be planted with robust indigenous species that to contribute to storm water management objectives.
- Storm water should be harvested onsite from roofed surfaces thus reducing the quantity (volume) of water received by downstream water resources as surface flow. This water is to be used onsite for non-potable applications or non-potable uses.
- Stilling basins will be installed below all outlets and suitable armouring of the downstream area (e.g. using reno-mattresses, rock pack, etc.) must be installed below all storm water outlets prior to flows entering downstream watercourses.
- The typical drawing of the proposed bridge structure presented within the Engineering Report is considered unacceptable, from an aquatic perspective, as the structure is designed so as to replace wetland habitat and confine flow. It must be redesigned or relocated to account for the sensitive

aquatic habitats.

- Bridges over wetland habitat must span the entire width of the freshwater habitat and channel wherever possible. It is recommended that the number of support piers to be located within the riparian zone (wetted zone and supported habitat) be limited in number as far as possible.
- The extent of infilling within the freshwater habitat must be minimised as far as possible.
- This is in alignment with a single span design instead of box culverts.
- Roads should follow the natural elevation contours where possible in order to maintain gentle gradients so as to minimise the risk of surface water runoff, high flow velocities and soil erosion.
- Bridge and culvert structures must be designed to adequately allow for the natural movement of water from the upstream to the downstream sides of the structure without inhibiting the natural movement of water and may not result in changes to flow volumes and velocities or create artificially inundated areas but allow for the free-flow movement of water.
- Use existing roads or upgrade existing tracks to cross wetlands rather than constructing entirely new roads wherever possible. Road design must ensure that flows through the wetlands to be traversed by roads remain unhindered and mimic the natural situation as far as possible.
- Roads crossing wetlands must be perpendicular to the general water flow direction and cross in a straight line as far as possible.
- The level of piped culverts (if required at all) needs to match the ground level of the wetland/river bed and should not be elevated above the wetland/river at the downstream end so as to cause erosion where water flows incorrectly onto the wetland surface/river bed from height.
- Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that 'headcut' erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert.
- Energy dissipaters should be installed to prevent scour at any culvert outlet. This can be constructed of appropriately sized rock armour and should have a concave cross-section to prevent the scouring of adjacent banks. Coarse bedding material or geotextile wrapped dump rock must be considered for use wherever the roads crosses wetland characterised by diffuse subsurface flows or within the non-perennial tributaries.
- Appropriate measures to dissipate flow velocity below bridge structures must be considered and designed for pre-construction.
- Avoid multiple watercourse crossings and align pipeline crossings of watercourses with planned road crossings where possible.
- Crossings must be constructed perpendicular to the natural direction of flow.
- Sewerage pump stations should not be located within 100 m of a watercourse and man holes should not be placed within the freshwater habitat.
- The existing pump station should ideally be relocated out of the Klein Swart River system and although this may not be a realistic/feasible option it merits investigation.
- Sewerage pump stations should not be located within 100 m of a watercourse and man holes should not be placed within the freshwater habitat. The existing pump station should ideally be relocated out of the Klein Swart River system and although this may not be a realistic/feasible option it merits investigation.
- It is recommended that baseline water quality measurements are undertaken.
- Water samples should be taken and analysed to determine the pre-development water quality, the effectiveness of remediation prior to commencement, and then in the operational phase of the development.
- Water samples should be taken and analysed to determine the pre-development water quality, the effectiveness of remediation prior to commencement, and then in the operational phase of the development.

- Construction Phase
  - Suitable engineering Method Statements for pipelines/roads crossing wetland and for general activities taking place within wetland must be developed.
  - A copy of the method statement will need to be made available at the construction site offices/site camp at all times.
  - Any direct modification of wetland and river habitat for the installation of culverts and road drainage must be limited to the construction servitude. For roads this should be limited to the road footprint.
  - The edges of the construction servitude / development zone within the vicinity of the freshwater habitat must be clearly staked-out and demarcated using highly visible material (e.g. danger tape) prior to construction commencing. Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
  - Access to and from the development area should be either via existing roads or within the construction servitude.
  - Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project.
  - A maximum construction working servitude width of 10m should be allowed on either side of the bridge. The 10m servitude includes the temporary bypass road required for access.
  - Contaminated runoff from the pipeline installation site should be prevented from directly entering any of the watercourses.
  - Construction of the pipeline should preferably be done during the drier months when the water quality impacts from the construction activities may impact on the downslope watercourses.
  - Measures to contain impacts caused during high rainfall events (such as substantial sedimentation and/or erosion) must be planned for and available for use.
  - Excavated rock and sediments from the construction zone, and including any foreign materials, should not be placed within the delineated rivers and riparian areas in order to reduce the possibility of material being washed downstream.
  - All bare slopes and surfaces to be exposed to the elements during clearing and earthworks must be protected against erosion using rows of silt fences, sandbags, hay bales and/or earthen berms spaced along contours at regular intervals.
  - Stockpiles must not be located within 50 metres of the wetland, dam, and must avoid the riparian buffer.
  - Access routes/paths through intact indigenous riverine vegetation must be preapproved and signed off by the ECO prior to construction commencing and must take into account the sensitivity of the vegetation occurring at the site
- Post Construction / Rehabilitation
  - Demarcations are to remain until construction and rehabilitation is complete.
  - For bridge crossings, once the base is cast and the piers are constructed, the excavated riparian zone must be backfilled subsoil and topsoils in the proper order that they were excavated.
  - All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO.
  - Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised.
  - It is recommended that a wetland rehabilitation plan be developed and implemented to conserve the freshwater habitat in the Klein Swart River.
  - Plant indigenous riparian vegetation along degraded unvegetated edges of watercourses, such as along the edge of the dam, to increase vegetation in the riparian zone and remove alien species.
  - Recovery of disturbed areas should be assessed for the first 6 months. Any areas that are not progressing satisfactorily must be identified and action must be taken to actively re-vegetate these

areas. If natural recovery is progressing well, no further intervention may be required.

- Operational Phase
  - Stormwater infrastructure must be inspected at least once every year (before the onset of rains) to ensure that it is working efficiently.
  - Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area
  - The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater.
  - Pumps, pipelines and other equipment should be regularly inspected and maintained.
  - Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented.
  - Engage with the community and Home Owners Association to explain the reasons why the buffer and the water resources are protected and what human activities are allowed. The landowners and community could be involved in the monitoring and rehabilitation.
  - Promote the use of the open space area (whilst avoiding the freshwater habitat and riparian area) for recreational activities.

8.4.4. Butterfly Survey

8.4.4.1. Key Findings

- Dave Edge conducted a Butterfly Survey for the proposed development in October 2019.
- Eight butterfly species were identified during the site inspection.
- The type of habitat found at the study site could host certain rare and endemic *Aloeides* species such as *A. pallida subspecies*, which are known to occur in the George area.
- The proposed development area on George Dam Portion 464A does not appear on the basis of this survey to contain any rare or endangered butterflies, and the eight butterflies recorded are reasonably common and widespread.

8.4.4.2. Key Impacts Identified

- The construction phase could results in a loss of habitat**.**

8.4.4.3. Recommended Mitigation

- No Mitigation Recommended.

8.4.5. Socio-Economic Impact Assessment

8.4.5.1. Key Findings

- Tony Barbour conducted a Socio-Economic Impact Assessment for the proposed development in March 2021.
- The purpose of the report was to assess the impacts of the proposed development on the surrounding community and the greater area as a whole.
- The key findings of the study are summarised under the following sections:
  - Fit with policy and planning;
  - Construction phase impacts;

- Operational phase impacts;
- No-development option

8.4.5.2. Key Impacts Identified

- The construction phase social issues identified included the Creation of employment and business opportunities. The potential negative impacts included:
  - Risks to local social networks posed by construction workers;
  - Security and safety risks posed by construction workers to local residents;
  - Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.
- The key social issues associated identified for the operational phase included:
- Potential positive impacts
  - Promotion of George as an educational centre;
  - Creation of employment opportunities;
  - Support local economic development;
  - Establishment of recreational spaces and community facilities;
  - Opportunity to show case green building design and technology.
- Potential negative impacts
  - Impact on existing tertiary institutions;
  - Impact on adjacent residential areas linked to noise, traffic anti-social behaviour of students etc;
  - Impact on Garden Route Dam.
- The findings of the SIA indicate that the proposed George educational facility is supported by National, Provincial and Local policy and planning documents. The establishment of the proposed facility also supports the George SDF, which notes that the development of George should reinforce George city's regional service centre role through attracting higher order, high quality education.
- The proposed development also provides an opportunity to create a well-designed educational facility that is complimented by a recreational open space system consisting of natural and open spaces, sports fields and parks.
- The findings of the SIA also highlight the benefits of universities to small towns, such as George.
- The potential negative impacts are largely confined to the immediately adjacent residential areas of Eden George, Loerie Park and the Glenwood Small Holding Area. These impacts relate to the increase in traffic and the potential risks posed by the behaviour of students on the quality of life in these areas. Although these impacts cannot be fully mitigated there are localised.
- The benefits on the other hand benefit the broader George economy and community. The establishment of the proposed George educational facility on the Remainder of Erf 464, George, is therefore **supported** by the findings of the SIA.

8.4.5.3. Recommended Mitigation

- The establishment of the single residential units along Meyer and Stander Road should be reconsidered. The option of removing the erfs located along Meyer and Stander Road should be considered. This would provide a buffer between the development and the existing houses. Access to units associated with the development would also be from internal roads and not directly of Meyer and Stander Road;
- If this is not feasible, the recommended that the development be designed to reduce the number of units locate along Meyer and Stander Road. The erf sizes should be similar to the existing erf sizes along Meyer and Stander Road;

- Access to the development from Stander Road should be reconsidered and or restricted.

8.4.6. Traffic Impact Assessment

8.4.6.1. Key Findings

- SMEC conducted a Traffic Impact Assessment for the proposed development in November 2020.
- The purpose of the report was to assess the traffic and transportation impacts of the proposed development relating to the impact on the surrounding road network.
- The site will be served by three accesses, as follows:
    - Access 1 along Stander Street (opposite Arthur Bleksley Street);
    - Access 2 along Saasveld Road (300 metres east of Meyer Street); and
    - Access 3 along Saasveld Road (600 metres east of Access 2, and opposite Road 1).
- It is anticipated that Phase 1 of the planned development would generate 758 and 1 483 new vehicular trips during the Weekday AM and PM Peak Hours respectively, and with Phase 2 it would generate a total of 1 480 and 2 763 new vehicular trips during the Weekday AM and PM Peak Hours respectively.
- The location and extent of individual land use parcels within the development will define the access to be used in serving those components. With this in mind, the anticipated trip distribution is shown in the table below.

Table 21: Trip Distribution: Site Access

Component	Access 1	Access 2	Access 3
University	40%	30%	30%
Hotel		100%	
Retail	10%	40%	50%

8.4.6.2. Key Impacts Identified

- The construction phase traffic expected as a result of the delivery of materials and employees driving to work and back could results in **traffic impacts on the existing road networks, especially at the key intersections.**
- **Damage to access roads** as a result of increased truck traffic.
- The operational phase traffic could result in **traffic impacts on the existing road networks**.

8.4.6.3. Recommended Mitigation

- It is recommended that the appropriate signage and information should be provided to the users of the key surrounding roads.
- Employees, contractors and truck drivers to ensure that they use the access route proposed and do not cause unnecessary traffic disruption or damage to lower grade roads.
- All drivers and machinery operators must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic, and must exercise due caution when entering/ exiting the site.
- Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users.
- Construction vehicles must adhere to the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles.
- The Contractor must ensure that any large or abnormal loads (including hazardous materials) that must be transported to/ from the site are routed appropriately, and that appropriate safety precautions are taken during transport to prevent road accidents.
- Where possible, construction traffic that may obstruct traffic flow on the surrounding roads should

be scheduled for outside of peak traffic times.
- Where possible, heavy machinery should be parked within a secure demarcated area within the footprint of the site instead of moving the machinery to and from the site each day.
- The necessary road markings, traffic signage, speed limits and early warning systems will need to be developed as per the requirements of the relevant roads-authority (and outcome of the traffic impact assessment) to ensure the safety of vehicular and pedestrian traffic during the operational phase of the development.
- The TIA should be approved by the George Local Municipality.
- The following transport improvements are proposed as part of the planned development:
    - 2024 Design Year:
        - Phase 6 (revised) of the George IPTN to serve the proposed development.
    - 2029 Planning Year:
        - Phase 6 (revised) of the George IPTN to serve the proposed development; and
        - Convert the Saasveld Road & Meyer Road intersection to a roundabout with one circulating lane.

8.4.7. Visual Impact Assessment

8.4.7.1. Key Findings

- Paul Bucholz conducted a Visual Impact Assessment for the proposed development in August 2019.
- The purpose of the report was to assess the interaction between the existing visual environment and the planned infrastructure.
- The proposed project site is located on top of a hill with views over the Garden Route Dam, George, Madiba Drive and Outeniqua mountains. The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages.
- The GSDF identifies the Seven Passes Road that starts at Madiba Drive as a significant scenic route that must be managed in such a way that it does not compromise the scenic views offered by the route.
- The area around the Garden Route Dam (GRD) has also been identified as an important view corridor.
    - The project site could be seen from the neighbourhood Glenbarrie in the west, the Outeniqua mountain to the north, the Nelson Mandela University in the east and the informal settlement of Thembalethu in the south. However, distance, development, vegetation and topography will reduce the actual view catchment that the site and project will have, to a much smaller area.
    - The zone of visual influence for the whole site of the proposed development is approximately 1.5 km south, 1 km west, 1km north and 2 km to the east. According to the specific criteria for visual impact assessments, the visibility of the site is local, being visible from the area less than 5km away.
    - Highly sensitive receptors of the site and proposed development include the residential areas located next to the project location (Eden, Loerie Park & Glenwood AH), the start of the scenic Seven Passes road (Madiba Drive), the Nelson Mandela University campus and the conservation areas north of the project site.
    - The visual sensitivity of the site was categorised as high, medium & low, depending on the portion of the development.
    - The Visual Absorption Capacity of the project site is moderate to high due to the elevated landform and vegetation.
    - The proposed development is an extension of the surrounding residential development of George (Loerie Park, Eden & Glenwood AH), and is as such compatible with the particular qualities of the area. However, because the development will be located on an elevated landform that includes a prominent ridgeline it will be clearly noticeable. The visual intrusion for the proposed development ranges from

none to moderate to high where the proposed development will partially fit into its surroundings but will be clearly noticeable.

8.4.7.2. Key Impacts Identified

- Pre-construction phase:
  - Removal of some vegetation will be required for earthworks. Some vegetation would also be cleared for building thereby increasing the visibility of the site and resulting in a loss of the vegetation visual resource.
- Construction phase:
  - During construction, earthworks would create cut and fill with slopes and would result in visual scarring of the landscape.
- Operational phase:
  - The site is currently undeveloped and covered in vegetation. The development would result in a change in visual character from a landscape covered in vegetation and without buildings to a built landscape.

8.4.7.3. Recommended Mitigation

Reducing unnecessary disturbance

- Retain as much of the existing vegetation as possible and where practical to screen construction activities from key viewing locations. This is also referred to as vegetation manipulation.
- Establish limits of disturbance that reflect the minimum area required for construction.
- Existing vegetation should be retained where possible through the use of retaining walls.

Colour selection

- The selection of colours that blend with or are in harmony with the surrounding landscape will drastically reduce the visual impact of the project. Such colours would include tonal variations of existing colours in the surrounding landscape. Contrasting but discordant colours that stand out in the landscape should be avoided.
- Select colours for smooth structures that are two or three shades darker than the background colours to compensate for shadow patterns created by natural textures that make colours appear darker.
- Galvanized steel on structures should be darkened to prevent glare. Low lustre paints should be used wherever possible to reduce glare.

Reduce contrasts from earthworks

- The scars left by excessive cut and fill activities during construction often leave long-lasting negative visual impacts. Where possible fitting the proposed project infrastructure to the existing landforms in a manner that minimizes the size of cuts and fills will greatly reduce visual impacts from earthwork.
- The dumping of excess rock and earth on downhill slopes should be limited.

Limiting the footprints and heights of structures

- Visual impact can be reduced by limiting the footprint of the buildings and hardscaping as well as the heights of buildings. Limiting the footprint of infrastructure will help to provide more greening areas in between buildings which will assist with screening and visual absorption of structures.

Development and architectural guidelines

- Development and building guidelines need to address procedural, planning and aesthetic considerations required for the successful design and development of the property and the architectural ethos of the development.
- The purpose of design guidelines is to protect and safeguard the environment and scenic resources and guide appropriate architectural character to protect the investment value of the development.

- The buildings should aim to be as visually recessive as possible.

Landscaping

- A Landscape Plan must be drawn up by a professionally registered Landscape Architect.

Lightning design

- Where possible construction activities should be conducted behind noise/light barriers that could include vegetation screens.
- Low flux lamps and direction of fixed lights toward the ground should be implemented where practical.
- Choose "full-cut off shielded" fixtures that keep light from going uselessly up or sideways. Full cutoff light fixtures produce minimum glare.
- .The design of night lighting should be kept to a minimum level required for operations and safety.
- The utilisation of specific frequency LED lighting with a green hue on perimeter security fencing.
- Where feasible, put lights on timers to turn them off each night after they are no longer needed

Restoration and reclamation

- The objective of restoration and reclamation efforts is to reduce the long-term visual impacts by decreasing the amount of disturbed area and blending the disturbed area into the natural environment while still providing for project operations.
- Topsoil should be stripped, saved, and replaced on earth surfaces disturbed by construction activities.
- Planting holes should be established on cut/fill slopes to retain water and seeds.
- Indigenous plant species should be selected to rehabilitate disturbed areas.
- Where possible rehabilitation efforts such should emulate surrounding landscape patterns in terms of colour, texture and vegetation continuums.
- Replacing soil, brush, rocks and forest debris over disturbed earth surfaces when appropriate, thus allowing for natural regeneration rather than introducing an unnatural looking grass cover.
- Revegetation of disturbed areas should occur as soon as practicable possible after the completion of various construction activities.

8.4.8. Cumulative Impacts

Cumulative impacts in relation to an activity are defined in the EIA Regulations as meaning ***"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".***

The cumulative impact on existing services, specifically water, sewerage, and stormwater is noted as a potential issue. However, while new developments such as Glenwood/Kraaibosch and other housing and mixed-use developments in the area may place pressure on existing services, these developments are in response to the housing shortage in the Municipality and are, therefore providing an essential service.

- **Socio – Economic Impact: Impact on existing services and pollution potential**: The proposed development would have a negative impact on existing services, specifically the stormwater, water and sewer networks in the area. When one takes into account the large number of other proposed developments of the same kind, **this will have a medium negative cumulative impact.** However, as the need for additional services is a part of the development of these proposals, many would include the required upgrades of the various services in the area. The difference between this development and other developments is that the stormwater and wastewater could affect the quality of the water in the Garden Route Dam should there not be proper monitoring and maintenance of the systems put in place to protect the water source. There is

already the potential for negative impacts from other existing suburbs such as Denneoord and Eden among others to flow into the Kat River and then into the dam. The cumulative impact of this impact will be significant should this development add to the pollution of the various suburbs which lie in the catchment of the Garden Route Dam.

Expected <u>positive</u> operational cumulative impacts include the following:

- **Socio Impact – Growth of George as an education centre:** The proposed development will contribute to the development of George as an education centre , with the associated benefits for the local economy. These benefits include the opportunity to upgrade and improve the skills sets in the area. This will have a **high positive cumulative impact.**

- **Economic Impact – Contribution to local economy and tourism:** The cumulative impact on the economy of the region is based on the potential University related expenditure and wages. These would result in a stable income for many residents as a result of the jobs created. With the current unemployment rate, this cumulative impact would ensure safety and security for many in the region This will have a **high positive cumulative impact.**

8.5. Description and Assessment of the Significance of Impacts Prior and After Mitigation

8.5.1. Construction Phase Impacts

Note: There is only one site location proposed for the development, however two layout Alternatives are being assessed (Alternative 1 and Alternative 2). These two alternatives have been assessed compared to the NO-GO (Alternative 3).

8.5.1.1. Agricultural Potential Impact – Loss of Agricultural Land

	Agricultural Potential Impact – Loss of Agricultural Land		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Loss of agricultural land that has the potential to be used for cultivation of crops or other agricultural purposes (opportunity cost). The land proposed for the development site has been mapped to have a moderate agricultural potential land use. The site was previously used for plantations. Although mapped as moderate agricultural potential, the soil is not suitable for crops and therefore plantations of pine were grown in the past		No Impact, as agricultural land would still be available for use however this would need to go through a NEMA process.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Site Specific; Long Term	Site Specific; Long Term	-N/A
Probability of occurrence:	Definite	Definite	-N/A
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	Marginal loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of	Low	Low	-N/A

	Agricultural Potential Impact – Loss of Agricultural Land		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact prior to mitigation			
Degree to which the impact can be mitigated:	Can be barely mitigated	Can be barely mitigated	-N/A
Proposed mitigation:	No mitigation is proposed or necessary given the low impact and current disturbed state of the site.		-N/A
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.2. Botanical Impact – Permanent Loss of Indigenous Vegetation

	Botanical Impact - Permanent Loss of Indigenous Vegetation		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.		No Impact, as no clearing would occur
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Permanent	Local; Permanent	-N/A
Probability of occurrence:	Probable	Probable	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A

	Botanical Impact - Permanent Loss of Indigenous Vegetation		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Cumulative impact prior to mitigation:	High	High	-N/A
Significance rating of impact prior to mitigation	Medium	Low-Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Ensure sufficient quality, quantity and connectivity of habitat remains throughout the area of the property. • Remove alien invasive plants and rehabilitate. • Develop and implement fire management program • Development of an EMPr to control construction impacts		-N/A
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.3. Botanical Impact – Loss of Species of Conservation Concern

	Botanical Impact - Loss of Species of Conservation Concern		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Numerous Species of Conservation Concern are present within the affected area, the most notable of which is the *Gladiolus fourcadei*, which will be removed during site preparation.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Permanent	Local; Permanent	-N/A

	Botanical Impact - Loss of Species of Conservation Concern		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Probability of occurrence:	Probable	Probable	-N/A
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• Make use of a search and rescue team to remove bulbs prior to the development of the road and transplant them in adjacent areas listed as highly sensitive *Gladiolus fourcadei.* • Alternatively, an onsite nursery should be established. A suitably qualified person must be in charge of this nursery. • Rescued plants need to be used in the landscape plan after development • Remove alien invasive plants and rehabilitate • Ensure sufficient quality, quantity and connectivity of habitat is available. • Develop and implement fire management program. • Development of an Environmental Management Programme (EMPr) to control construction impacts		-N/A
Cumulative impact post mitigation:	Medium	Medium	-N/A

	Botanical Impact - Loss of Species of Conservation Concern		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Significance rating of impact after mitigation	Medium - Low (-)	Low (-)	-N/A

8.5.1.4. Botanical Impact – Susceptibility of some areas to erosion as a result of construction related disturbances.

	Botanical Impact - Susceptibility of some areas to erosion as a result of construction related disturbances.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.		No Impact, as no vegetation clearing or soil disturbance.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Site Specific; Medium Term	Site Specific; Medium Term	-N/A
Probability of occurrence:	Probable	Probable	-N/A
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	Marginal loss of resource	-N/A
Cumulative impact prior to mitigation:	Low	Low	-N/A
Significance rating of impact prior to mitigation	Low	Low	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• Suitable measures must be implemented in areas that may be susceptible to		-N/A

	Botanical Impact - Susceptibility of some areas to erosion as a result of construction related disturbances.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	erosion, including but not limited to gabions and runoff diversion berms (if necessary). • Areas must be rehabilitated and a suitable cover planted once specific phases of construction is completed. • If site development does not occur soon after preparation of the site, a suitable cover to be established as a temporary measure. • Development of an Environmental Management Plan (EMP) to control construction impacts		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.5. Contamination & Pollution Impact – Associated with Construction Activities

	Contamination & Pollution Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Construction activities will generate waste. In addition, fuel, oil, lubricants and other pollutants may leak from vehicles/ machinery and contaminate the soil. Pollution and soil contamination could also occur from chemical toilets, cement mixing directly on the soil and stormwater runoff may flow over the site camp area and carry contaminants off-site.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Medium term	Local; Medium term	-N/A
Probability of occurrence:	Probable	Probable	-N/A
Degree to which the	Partly reversible	Partly reversible	-N/A

	Contamination & Pollution Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact can be reversed:			
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resources	Marginal loss of resources	-N/A
Cumulative impact prior to mitigation:	Low	Low	-N/A
Significance rating of impact prior to mitigation	Medium – High	Medium - High	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	The appointed Environmental Control Officer (ECO) must undertake at least one site inspection per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP. **General Pollution Management:** • No pollution of surface water or ground water resources may occur due to any activity on the site. • No storm water runoff from any premises containing waste, or water containing waste emanating from construction activities may be discharged into the environment. Polluted stormwater must be contained on the site. • Cement batching / mixing may not take place directly on the soil surface, it must be done on an impervious lining that will prevent cement particles from contaminating the soil. **General Waste Management:** • Dedicated waste bins or skips must be provided on site, and kept in a demarcated area on an impermeable surface.		-N/A

	Contamination & Pollution Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	• Separate waste bins/skips must be provided for recyclable waste, general waste and hazardous waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site camp, or in separate skips until removal. • Waste must be placed in the appropriate waste bins/skips/ stockpiles. • Hazardous waste bins must be kept on an impermeable bunded surface capable of holding at least 110% of the volume of the bins. • Skips/ bins must be provided with secure lids or covering that will prevent scavenging and windblown waste or dust. • Waste bins/skips must be regularly emptied and must not be allowed to overflow. • Construction workers must be instructed not to litter and to place all waste in the appropriate waste bins provided on site. • The Contractor must ensure that all workers on site are familiar with the correct waste disposal procedures to be followed. • Waste generated on site must be classified and managed in accordance with the National Environmental Management: Waste Act – Waste Classification and Management Regulations (GN No. R. 634 of August 2013). • Disposal of waste to landfill must be undertaken in accordance with the National Environmental Management: Waste Act – National Norms and Standard for the Assessment of Waste for Landfill Disposal (GN No. R. 635 of August 2013). • All waste, hazardous as well as general, which result from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF). **Pollution Management – hydrocarbons (oil, fuel etc.)** • Vehicles and machinery must be in good working order and must be regularly inspected for leaks. • If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate location for repair. The ECO has the authority to request that any vehicle or piece of equipment that is contaminating the environment be removed from the site until it has been satisfactorily repaired. • Repairs to vehicles/ machinery may take place on site, within a designated		

	Contamination & Pollution Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	maintenance area at the site camp. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs. • Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips. • Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks. • Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage. • Where feasible, fuel tanks should be elevated so that leaks are easily detected. • A spill kit to neutralise/treat spills of fuel/ oil/ lubricants must be available on site, and workers must be educated on how to utilise the spill kit. • Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste. **Pollution Management – Ablution facilities** • Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over. • Toilets must be located well outside of any storm water drainage lines, and may not be linked to the storm water drainage system in any way. • Chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets. **Pollution Management – Hazardous Substances** • Any hazardous substances (materials, fuels, other chemicals etc.) that may be required on site must be stored according to the manufacturers' product-storage requirements, which may include a covered, waterproof bunded housing structure. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and		

	Contamination & Pollution Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases. • Hazardous chemicals and fuels should be stored on bunded, impermeable surfaces with sufficient capacity to hold at least 110% of the capacity of the storage tanks. **Cement Batching:** • Cement batching must take place on an impermeable surface large enough to retain any slurry or cement water run-off. If necessary, plastic/ bidem lined detention ponds (or similar) should be constructed to catch the run-off from batching areas. Once the water content of the cement water/ slurry has evaporated the dried cement should be scraped out of the detention pond and disposed of at an appropriate disposal facility authorised to deal with such waste • Cement batching should take place on already transformed areas within the footprint of the facility. • Unused cement bags must be stored in such a way that they will be protected from rain. Empty cement bags must not be left lying on the ground and must be disposed of in the appropriate waste bin. • Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.6. Dust & Noise Impact – Associated with Construction Activities

	Dust & Noise Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Dust impacts may result due to construction activities and excavation activities on the site. Excavations and associated earth-moving activities may generate noise and vibration which may pose a nuisance to surrounding residents and other land users. Movement of heavy vehicles to & from the site may generate noise, which may affect surrounding residents.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Site Specific; Temporary	Site Specific; Temporary	-N/A
Probability of occurrence:	Highly probable	Highly probable	-N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	Low	Low	-N/A
Significance rating of impact prior to mitigation	Medium	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	**Dust Mitigation:** • Land clearing and earthmoving activities should not be undertaken during strong winds, where possible. • Cleared areas should be provided with a suitable cover as soon as possible, and not left exposed for extended periods of time. • Stockpiles of topsoil, spoil material and other material that may generate dust		-N/A

	Dust & Noise Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	must be protected from wind erosion (e.g. covered with netting, tarpaulin or other appropriate measures. Note that topsoil should not be covered with tarpaulin as this may kill the seedbank). • The location of stockpiles must take into account the prevailing wind direction, and should be situated so as to have the least possible dust impact to surrounding residents, road-users and other land-users. • Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution. • The speed limit should be set at 20-40km/h. • Dust must be suppressed on access roads and the construction site during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of excessive run off. • Dust suppression measures such as the wetting down of sand heaps as well as exposed areas around the site must be implemented especially on windy days. • The use of straw worked into the sandy areas may also help and the ECO must advise when this is necessary. • If dust appears to be a continuous problem the option of using shade cloth to cover open areas may be necessary or the erecting of shade netting above the fenced off are may need to be explored. • All vehicles transporting sand need to have tarpaulins covering their loads which will assist in any windblown sand occurring off the trucks. • Work on site must be well-planned and should proceed efficiently so as to minimise the handling of dust generating material. • Dust levels specified in the *National Dust Control Regulations* (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m^2/day, measured using reference method ASTM D1739; • A Complaints Register must be available at the site office for inspection by the ECO		

	Dust & Noise Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	of dust complaints that may have been received. **Noise Mitigation:** • A noise complaints register will be opened. • Excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible. • Work on site must be well-planned and should proceed efficiently so as to limit the duration of the disturbance. • Vehicles and equipment must be kept in good working condition. • Machinery and equipment should be fitted with mufflers/ exhaust silencers. • No unnecessary disturbances should be allowed to emanate from the construction site. • Due to the proximity of the proposed development site to residents, noise levels must be kept to a minimum at all times. If excessive noise is expected on the boundary of the residential erven bordering the site they must be informed in advance of when the high noise levels will occur and for how long they will occur. • Workers should be educated on how to control noise-generating activities that have the potential to become disturbances, particularly over an extended period of time. • Noise levels must comply with the relevant health & safety regulations and SANS codes and should be monitored by the Health & Safety Officer as necessary and appropriate. • Affected parties must be informed of the excessive noise factors. • The noise management and monitoring measures prescribed in the EMPr must be adhered to. The appointed Environmental Control Officer (ECO) must undertake a site inspection once per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved		

	Dust & Noise Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	EMP. These reports should be distributed to the Environmental Liaison Committee consisting of community representatives, local organisations, relevant authorities and municipal representatives must be established.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.7. Faunal Impact – Loss of habitat

	Faunal Impact – Loss of habitat		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Activity will result in the loss of habitat for faunal species		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Long Term	Local; Long Term	-N/A
Probability of occurrence:	Highly Probable	Highly Probable	-N/A
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	Marginal loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium-High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population (ecological corridors). • Remove alien invasive plants and rehabilitate.		-N/A
Cumulative impact post mitigation:	Low-Medium	Low-Medium	-N/A
Significance rating of impact after mitigation	Low-Medium (-)	Low (-)	-N/A

8.5.1.8. Faunal Impact – Loss of Faunal Species

	Faunal Impact – Loss of Faunal Species		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Activity may result in the loss of certain faunal species, such as the identified amphibian, reptile, mammal and bird species currently on the site.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Long Term	Local; Long Term	-N/A
Probability of occurrence:	Highly Probable	Highly Probable	-N/A
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	Marginal loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium-High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Protect reptiles from harm during the construction phase and translocate individuals where possible. • Limit speeds of construction vehicles.		-N/A
Cumulative impact post mitigation:	Low-Medium	Low-Medium	-N/A
Significance rating of	Low-Medium (-)	Low (-)	-N/A

	Faunal Impact – Loss of Faunal Species		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact after mitigation			

8.5.1.9. Freshwater Resources Impact – Loss and disturbance of Aquatic Vegetation & Habitat

	Freshwater Impact - Disturbance/loss of aquatic vegetation and habitat.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The project will require the majority of vegetation on the property to be cleared resulting in land cover changes in the catchments. The machinery, vehicles and workers (i.e. turning areas and crossings) needed to construct the roads and stormwater infrastructure will transform areas of riparian habitat. The remaining wetland habitat on the Klein Swart watercourse will be either replaced or at least compromised by the construction of infrastructure.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Regional; Medium Term	Local; Medium Term	-N/A
Probability of occurrence:	Definite	Definite	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to mitigation:	High	High	-N/A
Significance rating of impact prior to mitigation	High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A

	Freshwater Impact - Disturbance/loss of aquatic vegetation and habitat.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Proposed mitigation:	• Bridges over wetland habitat must span the entire width of the freshwater habitat and channel wherever possible. It is recommended that the number of support piers to be located within the riparian zone (wetted zone and supported habitat) be limited in number as far as possible. • The extent of infilling within the freshwater habitat must be minimised as far as possible. This is in alignment with a single span design instead of box culverts. • Use existing roads or upgrade existing tracks to cross wetlands rather than constructing entirely new roads wherever possible. • Avoid multiple watercourse crossings and align pipeline crossings of watercourses with planned road crossings where possible. • The buffer area must be considered as a No Go area for infrastructure. • Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils. • No equipment laydown or storage areas must be located within delineated freshwater buffer zone.		-N/A
Cumulative impact post mitigation:	Medium	Low	-N/A
Significance rating of impact after mitigation	Medium (-)	Low (-)	-N/A

8.5.1.10. Freshwater Resources Impact – Sedimentation and Erosion

	Freshwater Impact - Sedimentation and Erosion.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION	Vegetation clearing and exposure of bare soils within and upslope of the aquatic habitat during		No Impact.

	Freshwater Impact - Sedimentation and Erosion.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
OF IMPACT:	construction will decrease the soil binding capacity and cohesion of the upslope soils and thus increase the risk of erosion and sedimentation downslope. This may cause the burying of aquatic habitat and also cause aquatic faunal fatalities. It may lead to the wetland ceasing to function. Ineffective site stormwater management, particularly in periods of high runoff, can lead to soil erosion from confined flows. Formation of rills and gullies from increased concentrated runoff. This increase in volume and velocity of runoff increases the particle carrying capacity of the water flowing over the surface. This is likely to be one of the most significant impacts upon the wetland. Any development on the steeply sloped areas, including roads, magnifies the potential for the watercourses to be impacted upon.		
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Regional; Long Term	Regional; Medium Term	-N/A
Probability of occurrence:	Highly Likely	Highly Likely	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to	High-Medium	Medium	-N/A

	Freshwater Impact - Sedimentation and Erosion.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
mitigation:			
Significance rating of impact prior to mitigation	High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Construction must be carried out during the dry season where possible and contingency plans must be in place for high rainfall events during construction. • Before any work commences, sediment control/silt capture measures (e.g. bidim/silt curtains) must be installed downstream/downslope of the active working areas. • Silt fences/curtains must be regularly checked and maintained (de-silted to ensure continued capacity to trap silt) and repaired where necessary. • When de-silting takes place the silt must not be returned to the watercourse. • Excavated rock and sediments from the construction zone, and including any foreign materials, should not be placed within the delineated rivers and riparian areas in order to reduce the possibility of material being washed downstream. • All bare slopes and surfaces to be exposed to the elements during clearing and earthworks must be protected against erosion using rows of silt fences, sandbags, hay bales and/or earthen berms spaced along contours at regular intervals. The spacing interval must be smaller for steeper slopes and if required the ECO should advise in this regard. • Stockpiles must not be located within 50 metres of the wetland, dam, and must avoid the riparian buffer. The furthest threshold must be adhered to. • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. Alternatively, the exposed slopes must drain into small temporary stormwater and silt traps/ponds.		-N/A

	Freshwater Impact - Sedimentation and Erosion.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Cumulative impact post mitigation:	Medium	Medium	-N/A
Significance rating of impact after mitigation	Medium (-)	Medium (-)	-N/A

8.5.1.11. Freshwater Resources Impact – Water Pollution

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	During construction there are a number of potential pollution inputs into the aquatic systems (such as hydrocarbons and raw cement). These pollutants alter the water quality parameters such as turbidity, nutrient levels, chemical oxygen demand and pH.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Regional; Short Term	Regional; Short Term	-N/A
Probability of occurrence:	Highly Likely	Probable	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	High	Medium	-N/A
Significance rating of impact prior to mitigation	High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	The appointed Environmental Control Officer (ECO) must undertake at least one site inspection per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP. • It is recommended that baseline water quality measurements are undertaken. • The recycling/reuse of dirty water is promoted; alternatively, this water will need		-N/A

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	to be directed into the sewer system. **General Pollution Management:** • No pollution of surface water or ground water resources may occur due to any activity on the site. • No storm water runoff from any premises containing waste, or water containing waste emanating from construction activities may be discharged into the environment. Polluted stormwater must be contained on the site. • Cement batching / mixing may not take place directly on the soil surface, it must be done on an impervious lining that will prevent cement particles from contaminating the soil. **General Waste Management:** • Waste must be placed in the appropriate waste bins/skips/ stockpiles. • Hazardous waste bins must be kept on an impermeable bunded surface capable of holding at least 110% of the volume of the bins. • Skips/ bins must be provided with secure lids or covering that will prevent scavenging and windblown waste or dust. • Waste bins/skips must be regularly emptied and must not be allowed to overflow. • Construction workers must be instructed not to litter and to place all waste in the appropriate waste bins provided on site. **Pollution Management – hydrocarbons (oil, fuel etc.)** • Vehicles and machinery must be in good working order and must be regularly inspected for leaks. • If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate location for repair. The ECO has the authority to request that any vehicle or piece of equipment that is contaminating the environment be removed from the site until it has been satisfactorily repaired. • Repairs to vehicles/ machinery may take place on site, within a designated		

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	maintenance area at the site camp. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs. • Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips. • Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks. • Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage. • Where feasible, fuel tanks should be elevated so that leaks are easily detected. • A spill kit to neutralise/treat spills of fuel/ oil/ lubricants must be available on site, and workers must be educated on how to utilise the spill kit. **Pollution Management – Ablution facilities** • Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over. • Toilets must be located well outside of any storm water drainage lines, and may not be linked to the storm water drainage system in any way. • Chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets. **Pollution Management – Hazardous Substances** • Any hazardous substances (materials, fuels, other chemicals etc.) that may be required on site must be stored according to the manufacturers' product-storage requirements, which may include a covered, waterproof bunded housing structure. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and		

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	measures to minimise negative environmental impacts during accidental releases. • Hazardous chemicals and fuels should be stored on bunded, impermeable surfaces with sufficient capacity to hold at least 110% of the capacity of the storage tanks. **Cement Batching:** • Cement batching must take place on an impermeable surface large enough to retain any slurry or cement water run-off. If necessary, plastic/ bidem lined detention ponds (or similar) should be constructed to catch the run-off from batching areas. Once the water content of the cement water/ slurry has evaporated the dried cement should be scraped out of the detention pond and disposed of at an appropriate disposal facility authorised to deal with such waste • Cement batching should take place on already transformed areas within the footprint of the facility. • Unused cement bags must be stored in such a way that they will be protected from rain. Empty cement bags must not be left lying on the ground and must be disposed of in the appropriate waste bin. • Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.12. Freshwater Resources Impact – Flow Modification

	Freshwater Impact – Flow Modification		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF	Land clearing and earth works upslope of the watercourses will reduce infiltration rates		No Impact.

	Freshwater Impact – Flow Modification		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
IMPACT:	and increase the surface runoff volume and velocity. Such changes in surface roughness and runoff rates may lead to some rill and gully erosion. Altered water inputs from upslope disturbances as well as modified water distribution and retention patterns will ultimately affect the hydrological integrity of water resources. The dam will however act as a type of buffer to changes downstream by regulating flow from the impoundment. The Klein Swart River is proposed to be crossed by roads and pipelines. The construction of such infrastructure will alter the flow pattern through dewatering and diversion activities. This may result in erosion and desiccation of wetland habitat that relies on prolonged flooding. Stormwater runoff outlets, if poorly planned/ designed, may concentrate surface flows and alter the manner in which flow enters the systems.		
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Short Term	Local; Short Term	-N/A
Probability of occurrence:	Definite	Definite	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium	Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• The mitigation of impacts must focus on managing the runoff generated by the		-N/A

	Freshwater Impact – Flow Modification		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	development and introducing it responsibly into the receiving environment. • The stormwater flows must enter the wetland areas in a diffuse flow pattern without pollutants. • Frequent, multiple stormwater outlets must be designed to prevent erosion at discharge points. • All erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural slope of the surface and located at the natural ground level. Structures such as these must be located within the layout footprint and not encroach into the buffer areas. • Inlet protection measures to capture solid waste and debris entrained in storm water entering the storm water management system (inlet protection devices) will be incorporated into the design of the system. • Roads should follow the natural elevation contours where possible in order to maintain gentle gradients so as to minimise the risk of surface water runoff, high flow velocities and soil erosion. • Bridge and culvert structures must be designed to adequately allow for the natural movement of water from the upstream to the downstream sides of the structure without inhibiting the natural movement of water and may not result in changes to flow volumes and velocities, or create artificially inundated areas but allow for the free-flow movement of water. • The level of piped culverts (if required at all) needs to match the ground level of the wetland/river bed and should not be elevated above the wetland/river at the downstream end so as to cause erosion where water flows incorrectly onto the wetland surface/river bed from height. • Energy dissipaters should be installed to prevent scour at any culvert outlet. This can be constructed of appropriately sized rock armour and should have a concave cross-section to prevent the scouring of adjacent banks. Coarse bedding material or geotextile wrapped dump rock must be considered for use wherever the roads crosses wetland characterised by diffuse subsurface flows or within the non-		

	Freshwater Impact – Flow Modification		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	perennial tributaries. • Appropriate measures to dissipate flow velocity below bridge structures must be considered and designed for pre-construction.		
Cumulative impact post mitigation:	Medium	Low	-N/A
Significance rating of impact after mitigation	Medium (-)	Low (-)	-N/A

8.5.1.13. Heritage Impact

	Heritage Impact		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The loss of Heritage Resources, including Archaeological and Paleontological Resources, due to land clearing and excavations on the site.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Site Specific; Permanent	Site Specific; Permanent	-N/A
Probability of occurrence:	Improbable	Improbable	-N/A
Degree to which the impact can be reversed:	Irreversible	Irreversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	Marginal loss of resource	-N/A
Cumulative impact prior to mitigation:	Negligible	Negligible	-N/A
Significance rating of impact prior to mitigation	Low	Low	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	In the event that any heritage resources (human remains, grave stones, stone tools, artefacts, old coins and pottery, fossil shell middens, rock art and engravings, remains of old built structures etc.) are encountered during construction: • The finding should be protected from further disturbance (ideally left in situ) and the ECO and relevant Heritage Authority should be notified. The finding should be handled and/or removed from site as per instructions issued by the Heritage Authority or delegated heritage specialist.		-N/A

	Heritage Impact		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Cumulative impact post mitigation:	Negligible	Negligible	-N/A
Significance rating of impact after mitigation	Negligible	Negligible	-N/A

8.5.1.14. Socio-Economic Impact –Creation of Business & Employment Opportunities

	Socio-Economic Impact –Creation of Business & Employment Opportunities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The majority of work during the construction phase is likely to be undertaken by local contractors and builders. The proposed development will therefore represent a positive benefit for the local construction and building sector in the Eden District Municipality (EDM) and George Local Municipality (GLM). The majority of the building materials associated with the construction phase will be sourced from locally based suppliers from the EDM and GLM. A significant portion of the annual wage bill will be spent in the local EDM and GLM.		The no-development option would result in a lost opportunity in terms of the employment opportunities associated with the construction. A high negative socio-economic impact significance would occur if the proposed development is not constructed.
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional; temporary	Regional; temporary	Regional; temporary
Probability of occurrence:	Definite	Definite	Definite
Degree to which the impact can be reversed:	N/A – this is a positive impact, proposed to be enhanced	N/A – this is a positive impact, proposed to be enhanced	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A – this is a positive impact, proposed to be enhanced	N/A – this is a positive impact, proposed to be enhanced	No loss of resource
Cumulative impact prior to mitigation:	Medium (positive)	Medium (positive)	Medium (negative)
Significance rating of	Medium (positive)	Medium (positive)	High (negative)

	Socio-Economic Impact –Creation of Business & Employment Opportunities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact prior to mitigation / **enhancement:**			
Degree to which the impact can be mitigated:	N/A – this is a positive impact, proposed to be **enhanced**	N/A – this is a positive impact, proposed to be **enhanced**	The NO-GO Alternative assumes no mitigation. It assumes the status quo.
Proposed **enhancement** / mitigation:	In order to enhance local employment and business opportunities associated with the construction phase of the project the following measures are proposed to be implemented: • The developer will inform the local authorities, local community leaders, organizations and councillors of the project and the potential job opportunities for local builders and contractors; • The developer will establish a database of local construction companies in the area, specifically SMME's owned and run by HDI's, prior to the commencement of the tender process for the bulk services component of the project. These companies will be notified of the tender process and invited to bid for project related work; • The developer in consultation with the appointed contractor/s will look to employ a percentage of the labour required for the construction phase from local area in order to maximize opportunities for members from the local HD communities.		The NO-GO Alternative assumes no mitigation. It assumes the status quo.
Cumulative impact post mitigation:	High (positive)	High (positive)	Medium (negative)
Significance rating of impact after **enhancement**	High (+)	High (+)	High (-)

8.5.1.15. Traffic & Safety Impact – Associated with Construction Vehicles

	Traffic & Safety Impact – Associated with Construction Vehicles		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	It is proposed to deliver a significant amount of materials and equipment to the site during the construction phase of the development. Numerous truck trips will be required every day that could cause a temporary disturbance to traffic in the area. Impacts are expected to occur to the traffic in the area due to increased truck and construction vehicle traffic expected during the construction phase. Construction vehicles may impact on the existing road conditions (road capacity and congestion). Vehicles may impact on road safety conditions due to an increase in construction phase vehicles entering and exiting the site and they may impact on the condition of the existing road network.		No Impact.
Nature of impact:	Negative	Negative	-No Impact
Extent and duration of impact:	Local; Temporary	Local; Temporary	-N/A
Probability of occurrence:	Highly Probable	Highly Probable	-N/A
Degree to which the impact can be reversed:	Completely reversible	Completely reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• All construction vehicles must adhere to traffic laws when travelling to and from the site.		-N/A

	Traffic & Safety Impact – Associated with Construction Vehicles		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	• All drivers and machinery operators must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic, and must exercise due caution when entering/ exiting the site. • Appropriate signage should be erected to warn other road users about the presence of construction vehicles. • Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. • Construction vehicles must adhere to the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles. • The Contractor must ensure that any large or abnormal loads (including hazardous materials) that must be transported to/ from the site are routed appropriately, and that appropriate safety precautions are taken during transport to prevent road accidents. • Where possible, construction traffic that may obstruct traffic flow on the surrounding roads should be scheduled for outside of peak traffic times. • Where possible, heavy machinery should be parked within a secure demarcated area within the footprint of the site instead of moving the machinery to and from the site each day.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.1.16. Visual Impact – Associated with Construction Activities

	Visual Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF	The construction phase is associated with temporary disturbance as a result of		No Impact.

	Visual Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
IMPACT:	construction (trench excavations, vehicles, machinery, fencing & signage) that may have a negative visual impact to the area.		
Nature of impact:	Negative	Negative	-No Impact
Extent and duration of impact:	Site Specific. Temporary	Site Specific. Temporary	-N/A
Probability of occurrence:	Definite	Definite	-N/A
Degree to which the impact can be reversed:	Partly reversible	Partly reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium – High	Medium - High	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Consult with the ECO when determining the appropriate site for the site camp. • The site camp must be kept neat and tidy and free of litter at all times. • Waste must be managed according to the EMPr and the mitigation measures listed above in terms of waste management. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy. • The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Work on site must be well-planned and well-managed so that work proceeds		-N/A

	Visual Impact – Associated with Construction Activities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	quickly and efficiently, thus minimizing the disturbance time. • The site camp may require visual screening via shade cloth or other suitable material. • Special attention should be given to the screening of highly reflective material. • Use of lighting (if required) should take into account surrounding residents and land users and should present little or no nuisance. Downward facing, spill-off type lighting is recommended. • Construction vehicles must enter and leave the site during working hours. The appointed Environmental Control Officer (ECO) must undertake at least once site inspection per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.2. Operational Phase Impacts

8.5.2.1. Botanical Impact – Invasion by exotic and alien species

	Botanical Impact - Invasion by exotic and alien species		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Site Specific; Medium Term	Site Specific; Medium Term	-N/A
Probability of occurrence:	Probable	Probable	-N/A
Degree to which the impact can be reversed:	Reversible	Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Moderate loss of resource	Moderate loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium	Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• Draft an alien invasive monitoring, control and eradication plan • Implement initial and follow-up alien invasive clearing and rehabilitate the area post clearing. • An appropriate fire regime must be applied to all the remaining natural areas that require periodic fire for rejuvenation.		-N/A

	Botanical Impact - Invasion by exotic and alien species		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.2.2. Botanical Impact – Disturbances to ecological processes

	Botanical Impact - Disturbances to ecological processes		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Activity may result in disturbances to ecological processes.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Long Term	Local; Long Term	-N/A
Probability of occurrence:	Probable	Probable	-N/A
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to mitigation:	High	High	-N/A
Significance rating of impact prior to mitigation	Medium-High	Medium-High	-N/A
Degree to which the	Can be mitigated	Can be mitigated	-N/A

	Botanical Impact - Disturbances to ecological processes		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact can be mitigated:			
Proposed mitigation:	• No clearing outside of development and infrastructure footprints to take place. • Open Space to be incorporated in final plan to include ecological corridors and riparian zones.		-N/A
Cumulative impact post mitigation:	Medium	Medium	-N/A
Significance rating of impact after mitigation	Medium (-)	Medium (-)	-N/A

8.5.2.3. Freshwater Resources Impact – Loss and disturbance of aquatic vegetation & habitat

	Freshwater Impact - Disturbance/loss of aquatic vegetation and habitat.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Roads, pipelines, culverts and bridges create migration barriers to biota, resulting in reach to zone scale instream biological impacts. Localised scour around structures or flow impediments may result and alter the natural bank and channel, channel bank stability and floodplain processes. Road and pipeline crossings that concentrate diffuse flows and can also inadvertently trigger gully formation. The stormwater infrastructure of the housing and associated road network will increase and concentrate flows into the watercourses. This may lead to erosion in the systems that compromises remaining habitat. The project will promote the establishment of disturbance-tolerant biota, including colonization by invasive alien species, weeds and pioneer plants within the remaining habitat. Although this impact is initiated during the construction phase it is likely to persist into the operational phase.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Permanent	Local; Permanent	-N/A
Probability of occurrence:	Highly Likely	Highly Likely	-N/A

	Freshwater Impact - Disturbance/loss of aquatic vegetation and habitat.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Degree to which the impact can be reversed:	Barely Reversible	Barely Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium	Low-Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• Demarcations are to remain until construction and rehabilitation is complete. • For bridge crossings, once the base is cast and the piers are constructed, the excavated riparian zone must be backfilled subsoil and topsoils in the proper order that they were excavated. • All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO and ELC. All disturbed areas must be prepared and then re-vegetated to the satisfaction of the ECO and ELC. Erosion control measures such as soil savers, eco-logs, sand bags and biodegradable silt fences must generally be installed prior to re-vegetation. • It is recommended that a wetland rehabilitation plan be developed and implemented to conserve the freshwater habitat in the Klein Swart River. Ideally this plan would also extend to the wetland areas on the Kat River. • Plant indigenous riparian vegetation along degraded unvegetated edges of watercourses, such as along the edge of the dam, to increase vegetation in the riparian zone and remove alien species.		-N/A

	Freshwater Impact - Disturbance/loss of aquatic vegetation and habitat.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	• It is recommended that landscaping promote the use of indigenous species common to the region and that as much natural ground cover is established on the site to help with binding soils and encouraging water infiltration, thus reducing overland flows and the pressure on storm water management infrastructure. • Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented. • Engage with the community and Home Owners Association to explain the reasons why the buffer and the water resources are protected and what human activities are allowed. The landowners and ELC could be involved in the monitoring and rehabilitation. • Promote the use of the open space area (whilst avoiding the freshwater habitat and riparian area) for recreational activities. Surrounding the dam buffer area, walkways, picnic benches, or cycling trails, are potential low impact land uses that are unlikely to impact upon the freshwater habitat. Promoting a sense of ownership from the residents of their open space area will benefit them as well as the environment. • A section of the Kat River Nature Reserve along the dam falls within the recommended buffer area. Although the reserve is currently poorly managed or utilised, there is potential to expand its protection to the rest of the buffer area and open space of the proposed development area. Corridors such as this are ecologically beneficial.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Low (-)	Low (-)	-N/A

8.5.2.4. Freshwater Resources Impact – Sedimentation and Erosion

	Freshwater Impact - Sedimentation and Erosion.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Where soil erosion problems and bank stability concerns initiated during the construction phase are not timeously and adequately addressed, these can persist into the operational phase of the development project and continue to have a negative impact downstream. The increase in hardened surface by development, and the impact of road and pipe crossings will be considerable and, if not mitigated against, will result in further erosion. Surface runoff and velocities will be increased, and flows will be concentrated by stormwater infrastructure.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Regional; Permanent	Regional; Permanent	-N/A
Probability of occurrence:	Highly Likely	Highly Likely	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Stormwater infrastructure must be inspected at least once every year (before the onset of rains) to ensure that it is working efficiently. • The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area.		-N/A

	Freshwater Impact - Sedimentation and Erosion.		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	• The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. • The mitigation of impacts must focus on managing the runoff generated by the development and introducing it responsibly into the receiving environment. • The stormwater flows must enter the wetland areas in a diffuse flow pattern without pollutants. • Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area.		
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of impact after mitigation	Medium (-)	Low (-)	-N/A

8.5.2.5. Freshwater Resources Impact – Water Pollution

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The greater the extent of hardened surfaces (e.g. roofs, parking lots etc.), the lower the infiltration of stormwater and therefore the greater the surface runoff and increase in flood peaks. A change in water distribution generally results in altered wetness regimes, which in turn affect the biophysical processes and the vegetation patterns. Urbanization of the catchment and its associated stormwater runoff is a threat to freshwater biodiversity not only because of the increased hydrological disturbance and habitat loss, but also because of an increased delivery of pollutants to streams. These pollutants often do not have a chronic effect on aquatic biota but their negative and collective effects may be realised over longer periods of time. The most problematic nutrients are nitrogen and phosphorus. Stormwater runoff from urban surfaces may include nutrients, pollutants, raw sewage and other domestic waste. The establishment of sewer pipes within and/or in close proximity to watercourses always poses a long term threat to the		No Impact.

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	water quality and ecological health of freshwater ecosystems due to the relatively high likelihood that surcharge events will occur at some point in the future.		
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Regional; Permanent	Regional; Permanent	-N/A
Probability of occurrence:	Highly Likely	Probably	-N/A
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	High	Medium	-N/A
Significance rating of impact prior to mitigation	High	Medium	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater. • Key maintenance will include litter and sediment clearing and the servicing and maintenance of key collection points like catch pits, detention tanks etc. Such maintenance should be budgeted for. • Appropriate waste water infrastructure must be designed to prevent any such water from entering the surrounding environment. • Pumps, pipelines and other equipment should be regularly inspected and maintained. Spare parts should be readily available. Downtime should be kept to a		-N/A

	Freshwater Impact – Water Pollution		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	minimum in order to prevent spillages and adverse environmental impacts. • The pipeline should be regularly monitored and maintained to ensure that any problems with the pipeline are rectified before they can impact on any watercourses. • The Department of Water regional office should be notified, as soon as possible, of any significant chemical spill or leakage to the environment where there is the potential to contaminate surface water or groundwater. Stop the existing effluent from entering into the river from the existing pump station. • Better management of the system is required to prevent water pollution. • Direct discharge of untreated effluent into the river is not permissible.		
Cumulative impact post mitigation:	Medium	Low	-N/A
Significance rating of impact after mitigation	Medium (-)	Low (-)	-N/A

8.5.2.6. Freshwater Resources Impact – Flow Modification

	Freshwater Impact – Flow Modification		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Hardened/artificial infrastructure will alter the natural processes of rain water infiltration and surface runoff, promoting increased volumes and velocities of storm water runoff, which can be detrimental to the rivers and wetlands receiving concentrated flows from these areas.		No Impact.
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Regional; Permanent	Regional; Permanent	-N/A
Probability of occurrence:	Definite	Definite	-N/A

	Freshwater Impact – Flow Modification		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Degree to which the impact can be reversed:	Partly Reversible	Partly Reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	Significant loss of resource	Significant loss of resource	-N/A
Cumulative impact prior to mitigation:	High	High	-N/A
Significance rating of impact prior to mitigation	High	High	-N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	-N/A
Proposed mitigation:	• Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented.		-N/A
Cumulative impact post mitigation:	Medium	Medium	-N/A
Significance rating of impact after mitigation	Medium (-)	Medium(-)	-N/A

8.5.2.7. Socio-Economic Impacts – Provision of Tertiary Education

	Socio-Economic Impact –Provision of Tertiary Education		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Education, especially higher education, is an investment in human capital which increases future output and the lifetime earnings of graduates. Universities lead to a more educated and higher earning workforce within a region. As such, universities and colleges have been singled out as the premier institutions for generating and maintaining		The No-Development option would represent a lost opportunity in terms of the benefits associated with the provision of tertiary education.

	Socio-Economic Impact –Provision of Tertiary Education		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	a nation's professional labour force.		
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional extent; permanent	Regional extent; permanent	Regional; temporary
Probability of occurrence:	Definite	Definite	Definite
Degree to which the impact can be reversed:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	No loss of resource
Cumulative impact prior to mitigation:	High positive	High positive	Medium (negative)
Significance rating of impact prior to mitigation / **enhancement:**	High positive	High positive	High (negative)
Degree to which the impact can be mitigated:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	The NO-GO Alternative assumes no mitigation. It assumes the status quo.
Proposed **enhancement** / mitigation:	The proposed development represents an enhancement measure on its own.		The NO-GO Alternative assumes no mitigation – status quo remains
Cumulative impact post mitigation:	High positive	High positive	Medium (negative)
Significance rating of impact after **enhancement**	High (+)	High (+)	High (-)

8.5.2.8. Socio-Economic Impact – Provision of Housing

	Socio-Economic Impact –Provision of Housing		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The proposed development will assist to address some of the housing backlog in the area.		The No-Development option would represent a lost opportunity in terms of the benefits associated with the provision of housing in the area.
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional extent; permanent	Regional extent; permanent	Regional; temporary
Probability of occurrence:	Definite	Definite	Definite
Degree to which the impact can be reversed:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	No loss of resource
Cumulative impact prior to mitigation:	Medium positive	Medium positive	Medium (negative)
Significance rating of impact prior to mitigation / **enhancement:**	Medium-High positive	Medium-High positive	Medium-High (negative)
Degree to which the impact can be mitigated:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	The NO-GO Alternative assumes no mitigation. It assumes the status quo.
Proposed **enhancement** / mitigation:	The proposed development represents an enhancement measure on its own.		The NO-GO Alternative assumes no mitigation – status quo remains
Cumulative impact post mitigation:	Medium (positive)	Medium (positive)	Medium (negative)
Significance rating of impact after	Medium-High (+)	Medium-High (+)	Medium-High (negative)

	Socio-Economic Impact –Provision of Housing		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
enhancement			

8.5.2.9. Socio-Economic Impact – Provision of formal Sports Facilities and Public Spaces

	Socio-Economic Impact – Provision of formal Sports Facilities, Public Spaces and Enhanced access to the Dam		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	▪ **Provision of public open spaces:** The development proposal places strong emphasis on the preservation and enhancement of natural assets present on the site. This development proposal has strategically harnessed the high-quality vegetation in order to allow these natural systems to flourish and contribute to the sustainability of this proposed development. These natural areas can then be enjoyed by students and residents from the area. ▪ **Provision of sports facilities**: The proposed development makes provision for the establishment of various sports facilities. These components will not only contribute to an improved quality of life for many students, but also the local municipality who can make use of the facilities after hours. ▪ **Provision of Enhanced Access to the Dam:** The development will allow access to the dam in a controlled and structured manner. This will mean that the dam and its recreational features can be enjoyed in a safe and experience enhancing manner. Currently there are no facilities to speak of when using the dam and no structured points of access. There should be structured community involvement in the form of the ELC, which is legally enforceable.		The No-Development option would represent a lost opportunity in terms of the benefits associated with the provision of formal sports facilities, however the public could continue to make use of the existing open spaces for running, cycling and fishing. Access to the dam would remain uncontrolled.
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional extent; permanent	Regional extent; permanent	Regional; temporary
Probability of occurrence:	Definite	Definite	Definite
Degree to which the impact can be reversed:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	N/A
Degree to which the impact may cause irreplaceable loss of resources:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	No loss of resource
Cumulative impact prior to mitigation:	Medium positive	Medium positive	Medium (negative)

	Socio-Economic Impact – Provision of formal Sports Facilities, Public Spaces and Enhanced access to the Dam		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Significance rating of impact prior to mitigation / **enhancement:**	Medium positive	Medium - High positive	Medium (negative)
Degree to which the impact can be mitigated:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	The NO-GO Alternative assumes no mitigation. It assumes the status quo.
Proposed **enhancement** / mitigation:	The proposed development represents an enhancement measure on its own. However, formalization of nature walks and the inclusion of environmental education facilities would further enhance the open spaces. Allowing local existing schools and adult sports teams access to the facilities would further enhance the provision of the formal sports fields and associated facilities. Formal access control and other boating facilities (such as sailing clubs) would further enhance the use of the dam by the public.		The NO-GO Alternative assumes no mitigation – status quo remains
Cumulative impact post mitigation:	Medium positive	Medium positive	Medium (negative)
Significance rating of impact after **enhancement**	Medium-High positive	Medium - High positive	Medium (negative)

8.5.2.10. Socio-Economic Impact – Creation of Business and Employment Opportunities

	Socio-Economic Impact – Creation of business and employment opportunities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The campus, as well as business and commercial components will create employment opportunities for local residents. The spend associated with universities extends to students, lecturers, as well as visitors and family. The residential component may also create some opportunities for domestic workers and gardeners etc. The majority of the employment opportunities are likely to benefit Historically Disadvantaged Individuals (HDIs). Given the high unemployment levels in the surrounding areas, coupled with the low income and education levels, this would represent a positive social impact.		The No-Development option would represent a lost opportunity in terms of the benefits associated with employment and business opportunities during the operation phase.

	Socio-Economic Impact – Creation of business and employment opportunities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	The operational phase will also create opportunities for local businesses, such as local maintenance and building companies, garden services and security companies, petrol stations, shops and restaurants etc. to service the student population and create opportunities for new businesses to develop. The local estate agencies in the area and legal firms would also benefit from the sale and resale of properties associated with the new development.		
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional extent; permanent	Regional extent; permanent	Regional extent; permanent
Probability of occurrence:	Definite	Definite	Improbable
Degree to which the impact can be reversed:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	Completely reversible
Degree to which the impact may cause irreplaceable loss of resources:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	No loss of resource
Cumulative impact prior to mitigation:	High positive	High positive	High negative
Significance rating of impact prior to mitigation / **enhancement:**	High positive	High positive	High negative
Degree to which the impact can be mitigated:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	Can be mitigated
Proposed **enhancement** / mitigation:	The proposed development represents an enhancement measure on its own.		The NO-GO Alternative assumes no mitigation – status quo remains
Cumulative impact post mitigation:	High positive	High positive	High negative

	Socio-Economic Impact – Creation of business and employment opportunities		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Significance rating of impact after **enhancement**	High (+)	High (+)	High (-)

8.5.2.11. Socio-Economic Impact – Broaden the Rates Base

	Socio-Economic Impact – Broaden the rates base		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	The development will result in an increase in the rates base. In addition, the proposed development would also generate revenue for the local municipality from the consumption of water and electricity.		The No-Development option would represent a lost opportunity in terms of the benefits associated with the an increase in the municipal rates base. The current situation would continue whereby the George Municipality allocates funds annually on security for the area and does not have the budget to maintain the open spaces.
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional extent; permanent	Regional extent; permanent	Regional extent; permanent
Probability of occurrence:	Definite	Definite	Improbable
Degree to which the impact can be reversed:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	Completely reversible
Degree to which the impact may cause irreplaceable loss of resources:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	No loss of resource
Cumulative impact prior to mitigation:	Medium positive	Medium positive	Low - Medium negative
Significance rating of impact prior to mitigation / **enhancement:**	Medium positive	Low-Medium positive	Low - Medium negative
Degree to which the impact can be mitigated:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	Can be mitigated
Proposed **enhancement** / mitigation:	The proposed development represents an enhancement measure on its own.		Constructing the proposed development.

	Socio-Economic Impact – Broaden the rates base		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Cumulative impact post mitigation:	Medium positive	Low-Medium positive	Medium negative
Significance rating of impact after **enhancement**	Medium (+)	Low-Medium (+)	Medium (-)

8.5.2.12. Socio-Economic Impact – Property Values of surrounding landowners

	Socio-Economic Impact – Property Values of surrounding landowners		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	Values of real estate are driven by various factors, among others supply and demand, interest rates, the contraction or expansion of the local economy, population growth rates and changes in disposable income to debt ratios. With the increase in facilities and the need for additional student housing, it is likely that surrounding properties values may increase due to their proximity to the campus.		The No-Development option would represent a lost opportunity in terms of the benefits associated with the an increase in the municipal rates base.
Nature of impact:	Positive	Positive	Negative
Extent and duration of impact:	Regional extent; permanent	Regional extent; permanent	Regional extent; permanent
Probability of occurrence:	Definite	Definite	Improbable
Degree to which the impact can be reversed:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	Completely reversible
Degree to which the impact may cause irreplaceable loss of resources:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	No loss of resource
Cumulative impact prior to mitigation:	Medium positive	Medium positive	Low - Medium negative
Significance rating of	Medium positive	Medium positive	Low - Medium negative

	Socio-Economic Impact – Property Values of surrounding landowners		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact prior to mitigation / **enhancement:**			
Degree to which the impact can be mitigated:	N/A – This is a positive impact proposed to be enhanced.	N/A – This is a positive impact proposed to be enhanced.	Can be mitigated
Proposed **enhancement** / mitigation:	The proposed development represents an enhancement measure on its own.		Constructing the proposed development.
Cumulative impact post mitigation:	Medium positive	Medium positive	Medium negative
Significance rating of impact after **enhancement**	Medium (+)	Medium (+)	Medium (-)

8.5.2.13. Traffic & Safety Impact

	Traffic & Safety Impact		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	A significant increase in traffic is expected to occur in the area as a result of the proposed development. It is anticipated that Phase 1 of the planned development (2024) would generate 758 and 1 483 new vehicular trips during the Weekday AM and PM Peak Hours respectively, and with Phase 2 (2029) it would generate a total of 1 480 and 2 763 new vehicular trips during the Weekday AM and PM Peak Hours respectively. Vehicles may impact on the existing road network and road safety conditions due to an increase in vehicles entering and exiting the site. However, standard traffic safety measures would be developed. Therefore, while the increased traffic may increase the likelihood of accidents, this would not be due to the lack of safety systems.		No Impact
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local extent; long term	Local extent; long term	-N/A
Probability of	Probable	Probable	-N/A

	Traffic & Safety Impact		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
occurrence:			
Degree to which the impact can be reversed:	Partly reversible	Partly reversible	-N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	-N/A
Cumulative impact prior to mitigation:	Medium	Medium	-N/A
Significance rating of impact prior to mitigation	Medium	Medium	-N/A
Degree to which the impact can be mitigated:	Can be partly mitigated	Can be partly mitigated	-N/A
Proposed mitigation:	• Convert the Saasveld Road & Meyer Road intersection to a roundabout with one circulating lane. • Development should be serviced by the George Integrated Public Transport Network. • Sidewalks be provided along internal roads to encourage pedestrian accessibility and mobility. • The necessary road markings, traffic signage, speed limits and early warning systems will need to be developed as per the requirements of the relevant roads-authority (and outcome of the traffic impact assessment yet to be undertaken) to ensure the safety of vehicular and pedestrian traffic during the operational phase of the development.		N/A
Cumulative impact post mitigation:	Low	Low	-N/A
Significance rating of	Low – Medium (-)	Low – Medium (-)	-N/A

	Traffic & Safety Impact		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
impact after mitigation			

8.5.2.14. Visual Impact – Land Sue Character & "sense of place"

	Visual Impact - Land use character & "sense of place"		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
DESCRIPTION OF IMPACT:	It is proposed to change the land use character and existing sense of place of the site from a largely undeveloped site to a built up mixed use development of approximately 119ha. The proposed development would impact on the "sense of place" of the area to sensitive receptors that can see the development. In addition, the landscape character of the surrounding scenic routes would be compromised.		No Impact
Nature of impact:	Negative	Negative	No Impact
Extent and duration of impact:	Local; Long Term	Local; Long Term	N/A
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact can be reversed:	Barely reversible	Barely reversible	N/A
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resource	No loss of resource	N/A
Cumulative impact prior to mitigation:	Medium – High	Medium	N/A
Significance rating of impact prior to mitigation	Medium – High	Medium	N/A
Degree to which the impact can be mitigated:	Can be mitigated	Can be mitigated	N/A
Proposed mitigation:	• The development must be designed so that buildings, structures, and other improvements do not extend above the existing ridgelines (high visual sensitivity) or alter the ridge profile significantly when viewed from the public streets, roads, water bodies or facilities where possible. • Infrastructure should be designed to conform to the natural topography and hillside setting of the project site.		N/A

	Visual Impact - Land use character & "sense of place"		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
	• Buildings and associated infrastructure located on the hillsides (moderate and low visual sensitivity) below ridgelines should follow the contours of the site and blend with the existing terrain to reduce bulk and mass. • Infrastructure should be positioned to allow adequate space for tree planting and other vegetation screening interventions. • Roof forms and rooflines should be broken into smaller building components to reflect the irregular forms of surrounding natural features. The slope of roofs should be oriented in the same direction as the natural slope. • A Landscaping Plan and an Architectural Plan should be compiled and included in the EMPR, post EA, before the development is constructed. The following general mitigation measures should be implemented to reduce the identified visual impacts: • Infrastructure should be visually unobtrusive. • Materials and colours used for the development should blend into the surrounding landscape. • Infrastructure should be grouped in clusters with open spaces between clusters. • Infrastructure should not interfere with the skyline (ridgelines), landmarks, major views and vistas. • The development should not increase light or noise pollution. • The development should correspond to the historical, architectural and landscape style of surrounding layout and buildings		
Cumulative impact post mitigation:	Medium	Medium	N/A
Significance rating of impact after mitigation	Medium (-)	Low-Medium (-)	N/A

9. ENVIRONMENTAL IMPACT STATEMENT

9.1. Summary of Key Findings of Impact Assessment

9.1.1. Summary of Construction Phase Impacts after Mitigation

The table below is a summary of the projected impacts that could take place during the construction phase of the development and the associated significance of the impact, post mitigation. These results have been informed by the specialist impact assessment reports undertaken to support this EIA.

Table 22: Summary Table of Projected Construction Phase Impacts <u>after mitigation</u>

CONSTRUCTION PHASE IMPACTS			
IMPACT	IMPACT SIGNIFICANCE (after mitigation)		
	Alternative 1	Alternative 2	Alternative 3: NO – GO
Agricultural Potential Impact - Loss of agricultural land	Low (-)	Low (-)	No Impact
Botanical Impact - Permanent Loss of Indigenous Vegetation	Low (-)	Low (-)	No Impact
Botanical Impact – Loss of Species of Conservation Concern	Medium - Low (-)	Low (-)	No Impact
Botanical Impact – Susceptibility of some areas to erosion as a result of construction related disturbances	Low (-)	Low (-)	No Impact
Contamination & Pollution of Soil and Water Resources	Low (-)	Low (-)	No Impact
Dust & Noise Impact Associated with Construction Activities	Low (-)	Low (-)	No Impact
Faunal Impact – Loss of habitat	Medium - Low (-)	Low (-)	No Impact
Faunal Impact – Loss of Faunal Species	Medium - Low (-)	Low (-)	No Impact
Freshwater Impact – Disturbance/loss of aquatic vegetation and habitat	Medium (-)	Low (-)	No Impact
Freshwater Impact - Sedimentation and Erosion	Medium (-)	Medium (-)	No Impact
Freshwater Impact – Water Pollution	Low (-)	Low (-)	No Impact
Freshwater Impact – Flow Modification	Medium (-)	Low (-)	No Impact
Heritage Impact – Loss of Heritage Resources	Negligible	Negligible	No Impact
Socio-Economic – Creation of business and employment opportunities	High (+)	High (+)	High (-)
Traffic & Safety Impact	Low (-)	Low (-)	No Impact
Visual Impact Associated with Construction Activities	Low (-)	Low(-)	No Impact

The following conclusions can be drawn from the impact assessment findings as shown in the impact tables above for the construction phase:

- The preferred development Layout (Alternative 2) is expected to result in environmental impacts, during the construction phase, to the physical, social, cultural and biological environment as opposed to the NO-GO Alternative 3 of not developing the site which is not expected to result in any physical, cultural or biological impacts to the environment during the construction phase because the NO-GO assumes the status quo will remain and no construction related impacts will occur to the environment. However, the no-development option would result in a lost opportunity in terms of the expected temporary employment opportunities associated with the construction phase. A high negative socio-economic impact significance in terms of employment and job opportunities would occur if the proposed development is not constructed (NO-GO Alternative 3).
- Freshwater impacts in terms of loss of habitat and associated biota, erosion and flow modification is expected to be mitigated to a Medium level of impact significance.
- Botanical and Faunal loss of habitat and species of conservation concern are expected to be mitigated to a Medium-Low significance.
- The Creation of business and employment opportunities are expected to result in a High Positive impact after enhancement.
- All other identified impacts are expected to be mitigated to a Low negative significance, which means that it is expected to mitigate the impact to the point where it is of limited importance.

9.1.2. Summary of Operation Phase Impacts after Mitigation

The table below is a summary of the projected impacts that could take place during the operational phase of the development and the associated significance of the impact, post mitigation.

Table 23: Summary Table of Projected Operation Phase Impacts <u>after mitigation</u>

OPERATION PHASE IMPACTS			
IMPACT	IMPACT SIGNIFICANCE (after mitigation)		
	Alternative A: Option 1	Alternative A: Option 2	Alternative C: NO – GO
Botanical Impact - Invasion by exotic and alien species	Low (-)	Low (-)	No Impact
Botanical Impact - Disturbances to ecological processes	Medium (-)	Medium (-)	No Impact
Freshwater Resources Impact – Disturbance/loss of aquatic vegetation and habitat	Low (-)	Low (-)	No Impact
Freshwater Resources Impact – Sedimentation and Erosion	Medium (-)	Low (-)	No Impact
Freshwater Impact – Water Pollution	Medium (-)	Low (-)	No Impact
Freshwater Resources Impact – Flow Modification	Medium (-)	Medium (-)	No Impact
Socio-Economic Impact - Provision of Tertiary Education	High (+)	High (+)	High (-)
Socio-Economic Impact - Provision of Housing	Medium - High (+)	Medium - High (+)	Medium - High (-)
Socio-Economic Impact – Provision of Sports Facilities and Public Spaces	Medium - High (+)	Medium - High (+)	Medium (-)
Socio-Economic Impact - Employment and	High (+)	High (+)	High (-)

OPERATION PHASE IMPACTS			
IMPACT	IMPACT SIGNIFICANCE (after mitigation)		
	Alternative A: Option 1	Alternative A: Option 2	Alternative C: NO – GO
business			
Socio-Economic Impact - Broaden the rates base	Medium (+)	Low-Medium (+)	Medium (-)
Socio-Economic Impact - Property Values of surrounding landowners	Medium (+)	Medium (+)	Medium (-)
Traffic & Safety Impact	Low – Medium (-)	Low – Medium (-)	No Impact
Visual Impact – Change of land use and "sense of place"	Medium (-)	Low - Medium (-)	No Impact
Visual Impact – Visual intrusion of night lighting	Low - Medium (-)	Low - Medium (-)	No Impact

The following conclusions can be drawn from the impact assessment findings as shown in the impact tables below for the operational phase:

- The preferred development Layout (Alternative 2) is expected to result in negative environmental impacts, during the operational phase, to the biological environment (freshwater, faunal and terrestrial systems), visual "sense of place" of the area, an increase in traffic as opposed to the NO-GO Alternative 3 of not developing the site which is not expected to result in any visual, traffic or botanical impacts because the NO-GO assumes the status quo will remain and no development will take place. However, the no-development option would result in a lost opportunity in terms of the expected employment and business opportunities associated with the operational phase, as well as the numerous positive impacts of the provision of tertiary education in the region.
- The proposed development Layout Alternative 1 is expected to result in similar environmental impacts, during the operational phase, however, it would result in slightly higher freshwater and visual impacts.
- Freshwater impacts in terms of erosion, water pollution and flow modification is expected to be mitigated to a medium to low level of impact significance, while loss of habitat is expected to have a Low-Negligible significance.
- Botanical impacts are expected to be mitigated to be of Low to Medium significance.
- The Provision of housing, formal sports facilities and open spaces are expected to result in Medium - High Positive impacts after enhancement. The provision of tertiary education and the creation of business and employment opportunities would have a High positive impact.
- Visual impacts were identified to be significant (Med-High) but they will be mitigated to a Medium to Low-Medium negative impact significance.
- Traffic & Safety impacts were also identified as being relatively significant but can be reduced to a Low-Medium impact significance.
- The potential cumulative impact on pollution in the Garden Route Dam is Medium, but with mitigation this can be reduced to Low-Medium.

9.2. EAP's Reasoned Opinion and Recommendations

- The proposed site is the best situated site for establishing the tertiary education campus. The proposed property to be developed is located entirely with the George Urban Edge and has been specifically set aside and planned for in various Municipal Planning Frameworks, including the SDF and IDP.
- The "No Go" alternative is the option of not developing the proposed campus and associated infrastructure development. The no-development option would result in a lost opportunity in terms of the employment opportunities associated with the construction and operation phase as well as the benefits associated with

the provision of tertiary education for the community. A significantly high negative socio-economic impact significance would occur if the proposed development is not constructed in terms of the lost opportunity.

- The NO-GO alternative would result in the conservation of the site and prevention of any further development (status quo). Should the site not be developed, one can expect the current use of the open area for running, cycling and fishing within the site will continue with the current level of security and safety concerns for the recreational users. However, the proposed development will allow for the current users to become involved in the future recreational planning and use of the area via a structured enforceable system namely the Environmental Authorisation with input from the Environmental Liaison Committee (ELC).
- The proposed development is compatible with and supports the key principles and objectives contained in the relevant key land use planning and policy documents that pertain to the Western Cape and George area, including the Western Cape Provincial Spatial Development Framework (2014), George Local Municipality Integrated Development Plan 2017-2022 and the George Local Municipality Spatial Development Framework (2019). The entire proposed development is also located within the Urban Edge. The proposed site has therefore been identified as a desirable site location for housing development.
- The most significant impacts associated with the proposed development, in the construction and operation phase, includes the expected impacts to the Freshwater Resources (habitat and biota), Botanical Impacts (loss vegetation of conservation importance) and the expected Visual Impact of the development in terms of the land use character of the site and "sense of place" of the area being significantly changed. Traffic and safety impacts are also noteworthy.
- The socio-economic benefits of the provision of a tertiary education campus including numerous job opportunities, the provision of housing and other much needed social facilities such as the hotel and sports facilities largely outweigh the biophysical, visual and traffic impacts identified in an area which is mostly disturbed and already transformed and planned for development purposes in the Municipal SDF (within the urban edge). The tertiary education campus is a recession proof long terms investment in ensuring George has the capacity to cater for future educational needs as the population grows.
- We believe that a "balanced approach" to impacts has been undertaken. We believe that although the proposed project will result in varying degrees of negative impacts as per above, in terms of visual, botanical and especially freshwater impacts, we are of the opinion that the Preferred Alternative layout (Alternative 2) along with the mitigation measures proposed will ensure that these impacts are reduced to an acceptable level of impact significance. These impacts have been weighed up against the positive impact that this proposed development will have on the socio-economic environment.
- Based on the findings of the EIA and the information presented by the specialists, the positive impacts of the preferred alternative outweigh the negative impacts of the NO-GO alternative and therefore the development should be **authorised** as long as the mitigation measures listed in this Report and the Environmental Management Programme are implemented.

9.3. Recommendations for Conditions of the Environmental Authorisation

- An ECO must be appointed in the Pre- Construction and Construction Phase to monitor that the applicant is in compliance with all of the requirements of the EMPr and the EA.
- An Environmental Liaison Committee consisting of community representatives, local organisations, relevant authorities and municipal representatives must be established. The ELC must play an oversight role with regard to the implementation of the Environmental Authorisation.
- An engineer must design a Detailed Design Stormwater Management Plan based on detailed hydrological flood modelling. This must be done before any land clearing take place. This detailed design plan must take the Conceptual Stormwater Plan included in the engineering services report findings into account. The Detailed plan must take into account avoiding contaminated runoff from the construction phase footprint area from entering the natural environment (appropriate grease traps and spill management plan).
- A Landscaping Plan must be compiled by a professionally registered Landscape Architect.
- Once the above reports are completed, including the detailed structure of the ELC, the reports must be

include in the Amended Environmental Management programme which must be approved by the DEADP prior to construction commencing.

- All of the mitigation measures listed in the EMPr and the specialist reports must be implemented.

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