ENVIRONMENTAL SCOPING ASSESSMENT

PROPOSED DEVELOPMENT OF THE KUISEB COUNTRY ESTATE AND ITS ASSOCIATED INFRASTRUCTURE ON PORTION A OF THE REMAINDER OF THE FARM LANDMISTER NO 331 (KHOMAS REGION)

FINAL ENVIRONMENTAL SCOPING REPORT FOR REVIEW BY THE ENVIRONMENTAL COMMISSIONER

NOVEMBER 2015

URBAN green cc
Town and Regional Planning Consultants
Environmental Managers

PROJECT INFORMATION

Project Title:	**PROPOSED DEVELOPMENT OF THE KUISEB COUNTRY ESTATE AND ITS ASSOCIATED INFRASTRUCTURE ON PORTION A OF THE REMAINDER OF THE FARM LANDMISTER NO 331 (KHOMAS REGION)**
Type of Project:	**ENVIRONMENTAL SCOPING ASSESSMENT**
Project Location:	**THE REMAINDER OF THE FARM LANDMISTER NO 331 (KHOMAS REGION)**
Project Number:	**2015/1-KHOM/WHK/KUISEB ESTATE**
Competent Authority:	**DIRECTORATE OF ENVIRONMENTAL AFFAIRS (MINISTRY OF ENVIRONMENT AND TOURISM)**
Proponent:	**MR JG MYBURGH** **FARM REMAINDER LANDMISTER NO. 331** **KHOMAS HOCHLAND** **PO BOX 22155** **WINDHOEK**
Consultancy:	**URBAN GREEN CC** **PO BOX 11929, KLEIN WINDHOEK** **TELEFAX: +264-61-300 820** **CELL: +264-81 129 5759** **E-MAIL: urbangreen@iway.na** **WEBSITE: www.urbangreenafrica.com**

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LIST OF ACRONYMS

Cº	Celsius
dB	Decibel
DEA	Directorate of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DR	District Road
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
i.e.	Example
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
FSR	Final Scoping Report
Ha	Hectare
I&AP	Interested and Affected Party
Km	Kilometre
Km/h	Kilometres per hour
KRC	Khomas Regional Council
L	Litre
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
mg	Milligram
mm	Millimetre
No	Number
Ptn	Portion
PPP	Public Participation Process
Re	Remainder
ToR	Terms of Reference
TDS	Total Dissolved Solids
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

It is the intention of the owner of Remainder of Farm Landmister No 331, hereafter referred to as the Proponent, to subdivide his property (Remainder of Farm Landmister No. 331) into a portion (Portion A), which again will be subdivided into 30 portions and the Remainder of the Farm Landmister No. 331, for the purpose to develop a low-key Country Estate (i.e. Kuiseb Country Estate). Portion A will be ±400ha in size, comprising of a 'residential' component and a 'conservation' component, which is almost 50/50 in surface. The layout of the 'residential' component with internal roads to the southern side of Portion A and the 'conservation' component to the northern side was done considering the already disturbed area to the southern part of Portion A. Ecologically sensitive areas (i.e. outcrops, vegetation clusters, and protected tree species) within each of the 27 portions will be demarcated and excluded from the developable portion of each Portion.

The concept is to have a low-density residential development that would be an environmentally sensitive and self-sustaining development, in touch with the limitations and potential of the surrounding natural environment. The entire Kuiseb Country Estate will be game fenced.

The proposed project includes certain activities that are listed as 'Listed Activities' according to Government Notice No. 29 of 6 February 2012, which requires that an Environmental Clearance Certificate (ECC) be obtained from the office of the Environmental Commissioner, thus requiring that an Environmental Impact Assessment (EIA) to be conducted.

The Proponent commissioned this EIA and appointed Urban Green cc to undertake the necessary study (i.e. Scoping Assessment), as prescribed by the Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), to enable an application for an Environmental Clearance Certificate with the Environmental Commissioner as required by Section 27(3) of the Environmental Management Act (No. 7 of 2007).

The Remainder of the Farm Landmister No 331 is situated approximately 52 km south-west of Windhoek, just north of the Friedenau Dam, Khomas Region (see Figure 1.1 - Locality Map). The portion to be developed is approximately 400ha in extent and is currently isolated and vacant.

Access to the Farm and smaller eastern portion is obtained via existing access of the DR1418 road, which is again linked with the C28. Electricity is supplied via an existing NamPower network, while water is supplied by extracted via existing boreholes. The eastern portion does not contain any electricity nor water infrastructure. Sewerage is currently provided in the form of a French drain system for the larger Farm, while the eastern portion does not contain any wastewater infrastructure. A Clarus Fusion Waste Water Treatment Plant will be installed, which treats all waste waters on-site, to then be used for dust suppression and/or gardening purposes on the Estate. Domestic waste collection will be outsourced to a local service provider.

The greatest sensitivity of the receiving environment is within the geohydrological aspect given the drainage towards the Kuiseb River and again feeding into the downstream water resources (i.e. localised boreholes and Friedenau Dam) along the Kuiseb River Catchment. The underlying geology is primarily schist, which is considered having a low groundwater potential and low risk of groundwater contamination. Along drainage channels and rivers, alluvium may be found which have a moderate to high groundwater potential, with an associated higher risk of groundwater pollution. It is thus extremely important that surface water and wastewater be managed and treated in such a manner not to cause any potential pollution of the immediate and surrounding receiving environments (Van Vuuren, 2015). The necessary mitigations have been proposed within the Report.

From an ecological perspective the Remainder of the Farm Landmister No 331 is still within a relative undisturbed state, although several evidence of past farming activities and related disturbances exists. The average plant production is high to very high with the variation in green vegetation biomass estimated at 10-15%. The overall plant diversity (all species - “higher” plants) in the general area is high and estimated at 400-499 species while the plant endemism is also high with >35 species while the Auas Mountains, east of the proposed development area, have >500 species of which at least 7% are viewed as Namibian endemics. Bush thickening or encroachment is not viewed as an economic problem in the general area. The ephemeral Kuiseb River and its tributaries as well as the Friedenau Dam are important habitats for a variety of species favouring larger trees and open water (Cunningham, 2015).

It is estimated that at least 78 reptile, 9 amphibian, 73 mammal, 261 bird species (breeding residents), 66-83 species of larger trees and shrubs (>1m) and up to 101 grasses are known to or expected to occur in the general Friedenau Dam area of which a high proportion (e.g. 35.9% of the reptiles) are endemics. Special care must therefore be taken to keep the natural beauty of the area as intact as possible by strategically placing dwellings within the undulating landscape and not disturbing the two sensitive outcrops or protected species found onsite. It is also recommended that an on-site vegetation survey be carried out to identify these species to be included in the proposed development’s layout pre-construction starts, as the exact location and footprint of the proposed residential dwellings to be constructed is not yet known. A preliminary list of these species has been included in Appendix E.

The overall cumulative impact of the proposed development on resources is expected to be ***low*** before mitigation and almost ***none*** after mitigation. An evaluation of the identified impacts that the proposed development may have on the environment (i.e. natural and social) during both the construction and operational phase suggests a small potential should none of the mitigations be implemented.

During the construction phase, these would include impacts associated with vegetation clearance (e.g. loss of biodiversity, dust generation, surface runoff, and erosion), construction noises, surface and groundwater pollution, and increased traffic movement (e.g. safety and increased load). Mitigation measures have been provided capable of controlling the extent, intensity and frequency

of some of these impacts, while the impact on habitat destruction due to vegetation clearance is not able to be mitigated. A direct positive impact of the proposed development is the creation of employment during the construction phase.

Impacts expected during the operational phase are dust and noise generation (e.g. residential vehicle movement to and from the dwellings), change in sense of place (agriculture to residential Country Estate), potential pollution as a result of untreated sewage or waste water leakages, increased traffic movement (e.g. safety and increased load). Mitigation measures have been provided that can control the extent, intensity and frequency of these impacts not to have any substantial negative results. A direct positive impact of the proposed development is the strengthening of the current development corridor stretching from Baumgartsbrunn Clinic and School to the Friedenau Dam, which has become increasingly important as a socio-economic hub for the Khomas Region.

Following this Study conducted, it was found that none of the potential impacts identified are regarded as having a significant impact to the extent that the proposed development not continue, subject to formal approval from NAMWATER and NAMPOWER to provide in the potable water and electricity services.

Given this, it is not to say that there will be no impact/s and potential threats as highlighted by the Study. Construction and operational activities need to be controlled by the Developer and Contractor, and monitored by the Khomas Regional Council to ensure that all potential impacts identified in this study and other impacts that might arise during implementation is properly identified in time and addressed in an effective manner to ensure protection of especially the immediate and downstream water resources.

This environmental assessment concludes that the intended development of the Kuiseb Country Estate at proposed Portion A of Remainder of the Farm Landmister No 331, as presented in this Report, is not expected to have a **significant** impact during both the construction- and operational phases (excluding potable water and electricity supply), as well as a **non-significant** cumulative impact.

CHAPTER 1 INTRODUCTION

It is the intention of the owner of Remainder of Farm Landmister No 331, hereafter referred to as the Proponent, to subdivide his property into a portion (Portion A), which again will be subdivided into 30 portions and the Remainder of the Farm Landmister No. 331, for the purpose to develop a low-key Country Estate (i.e. Kuiseb Country Estate).

The proposed project includes certain activities that are listed as 'Listed Activities' according to Government Notice No. 29 of 6 February 2012, which requires that an Environmental Clearance Certificate (ECC) be obtained from the office of the Environmental Commissioner, thus requiring that an Environmental Impact Assessment (EIA) to be conducted.

This Environmental Scoping Report presents information on the property and its surroundings; the proposed development; legislation applicable to the study conducted; the EIA approach and methodology followed; public consultation conducted; the sensitivity of the receiving environment; nature and extent of potential impacts (environmental and social) and required mitigations; further studies required (if any) and a conclusion and recommendation based on the findings.

This chapter of the Report provides a background and motivation to the proposed development, the terms of reference stipulated to the Consultant, the study assumptions and limitations, a locality indication of the study area, the purpose and goals, an opportunity to comment on this Report and the structure of the Report.

1.1 BACKGROUND AND MOTIVATION TO THE PROPOSED DEVELOPMENT

The Proponent's farm (i.e. Remainder of Farm Landmister No 331) is currently utilised for commercial cattle farming except for an isolated patch of approximately 400ha situated east of the DR1418 road and north of the Friedenau Dam. This portion has due to its size (commercially unviable) and high incidences of theft (estimated 200 cattle over 10 years) not been used for commercial farming purposes and has to a certain extend become redundant and a 'waste land' with little financial benefit to the owner.

The larger farm accommodates structures and infrastructure used for commercial farming purposes, while the portion situated to the eastern side of the DR1418 does not contain any structures or infrastructure. This eastern portion (Portion A), upon which the proposed Kuiseb Country Estate will be developed, comprise of undulating terrain with very steep slopes found within the eastern section overlooking the Kuiseb River.

The proponent has motivated the proposed development in terms of the following aspects:

- **Compatibility with Surrounding Activities**

This particular area in close proximity to the Farm, contains a wide variety of other types of activities (i.e. tourism; educational; commercial) and is not exclusively agriculture anymore (see Figure 5.1). The DR1418 forms a central spine within a slowly expanding development axis leading southwards from the existing Baumgartsbrunn Farm towards the Friedenau Dam. A variety of activities are located at the mentioned intersection and along this spine, which has increasingly become an important socio-economic hub.

- **Access**

The property's location is considered very favourable in terms of access. The Farm and its smaller eastern portion that is set aside for the proposed development can be reached via existing access roads of the DR1418 road, which is again linked with the C28. Road access therefore exists and would only be upgraded and constructed where further applicable. The proposed access road to the development would be designed to the required Road Authority's standards.

- **Services**

As the property currently falls outside a municipal serviced area, the larger Farm however does have some services infrastructure such as water and power supplied from groundwater boreholes and NamPower, respectively. Proposed Portion A currently does not contain any electricity nor water infrastructure but can be linked up with the existing services (i.e. NamPower & NamWater) available within the immediate area, subject to approval from the respective service providers.

Sewerage is treated on the Farm in the form of a french drain system, while no service exists at proposed Portion A. The proposed development is not envisaged to generate any large volumes of waste water and therefore a Clarus Fusion Waste Water Treatment Plant is recommended to be installed to treat all waste waters on-site, to then be used for dust suppression and/or gardening purposes on the Estate.

Domestic waste is being removed by a private contractor on regular intervals to a licensed landfill site and will continue to do so once the development is up and running. A designated area (enclosed waste building) will be designed to appropriate standards for a communal disposal point before collection. Recycling methods will also be implemented.

1.2 TERMS OF REFERENCE

No formal Terms of Reference (ToR) were provided, but rather were inferred from the requirements of the applicable legislation to enable an application for an Environmental Clearance

Certificate (ECC) with the Environmental Commissioner as required by Section 27(3) of the Environmental Management Act (No. 7 of 2007).

The purpose of this Study is to apply for an ECC as per the requirements of the Environmental Management Act (Act No 7 of 2007) only. All other permits or licenses (see section 4.2.2) required for the operation of the proposed development still needs to be applied for by the Proponent.

1.3 STUDY ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations applied to the Study:

- It is assumed that the information provided by the Proponent, the project Town Planner (Quadrant Namibia (Pty) Ltd), Specialists and applicable authorities is accurate;
- No alternative site for assessment was provided;
- The impact on water and electricity capacity and infrastructure was not assessed, although not expected to have an implication following discussions between the Project Town Planner (Quadrant Namibia (PTY) Ltd.) and the respective bulk suppliers;
- Formal approvals and permits with regards to the supply of water and electricity services and the handling of sewage need to be obtained by the Proponent before commencement of the development;
- It is assumed that there will be no significant changes to the proposed development (see Chapter 7) or effected environment (see Chapter 5) between the completion of this assessment and implementation of the proposed development that could substantially influence findings, recommendations with respect to mitigation and management, etc.;
- The study involved the assessment of impacts on the current conservation value of affected land and not on either the historic or potential future conservation value; and
- This assessment is based on the prevailing environmental context.

1.4 LOCALITY OF THE STUDY AREA

The Remainder of the Farm Landmister No 331 is situated approximately 52 km south-west of Windhoek, just north of the Friedenau Dam, Khomas Region (see Figure 1.1 - Locality Map). The Farm is situated outside of the newly extended municipal jurisdictional area of the City of Windhoek. The portion to be developed is approximately 400ha in extent and is currently isolated and vacant.

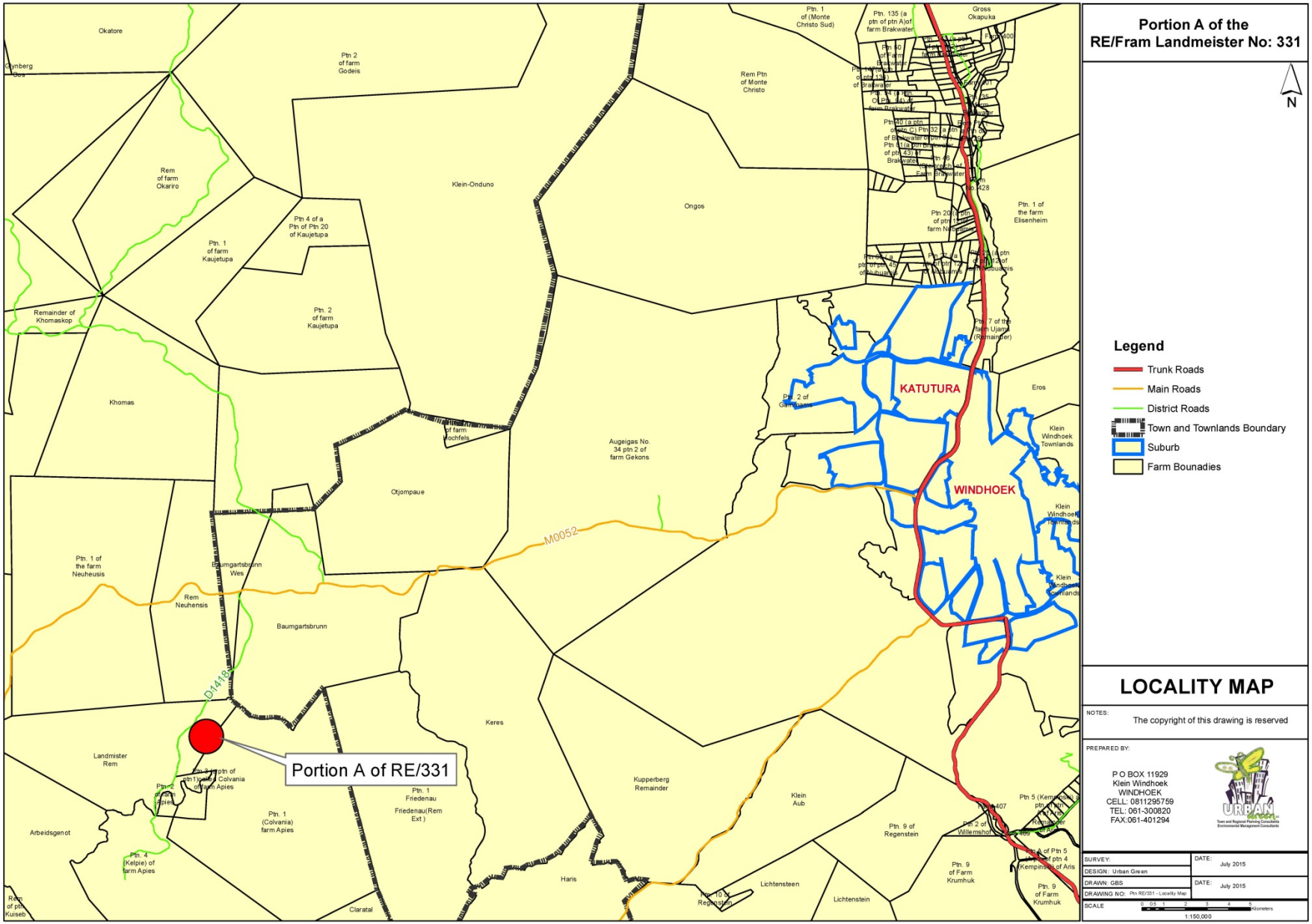


Figure 1.1 – Locality Map

1.5 PURPOSE AND GOAL OF THIS REPORT

This Final Scoping Report (FSR) has been compiled as part of an assessment that has been undertaken for the proposed development of the proposed Kuiseb Country Estate and associated infrastructure. This FSR summarises the process followed to date, provides a description of the project and addresses the issues raised by Interested and Affected Parties (I&APs). It further provides an assessment of the impacts of the proposed development along with mitigation measures.

The Draft version of this Report was made available for public review and comment (Chapter 6) during October 2015. Comments received have been included into this Final Scoping Report (Table 6.2), which has been submitted to the Directorate of Environmental Affairs (DEA) for decision-making and issuing of an ECC.

After the DEA has reached a decision, all registered I&APs on the project database will be notified of the decision and the requirements of the statutory Appeal Period.

1.6 STRUCTURE OF THE REPORT

This report consists of nine chapters as outlined below.

Table 1.1 – Structure of the Report

SECTION	CONTENTS
Executive Summary	**Executive Summary** Provides an overview of the main findings of the Study.
Chapter 1	**Introduction** Provides a background and motivation to the proposed development; Terms of Reference; the study assumptions and limitations; overview of the study area and outlines the purpose, goals and structure of the Report. It also describes the procedure for submitting comment on the Study.
Chapter 2	**Project Team and Expertise** Provides an overview of the role-players participating in the project as well as their experiences.
Chapter 3	**Study Approach and Methodology** Summarises the framework for environmental management in Namibia, the EIA process and methodology followed as part of the Scoping Study with particular attention to the associated public participation.
Chapter 4	**Legislations Applicable to the Development** Provides an overview of the key legislation having an implication of activities associated with the proposed development.

Chapter 5	**The Affected Environment** Describes the details pertaining to the site and urban characteristics of the surrounding area, the existing biophysical, socio-economic and cultural-historic environment of the study area.
Chapter 6	**Details of the Public Participation Process** Explains in detail the entire public consultation process followed as part of this study. Feedback received from registered Interested and Affected Parties and Stakeholders are listed as well.
Chapter 7	**Description of the Proposed Development** Provides a description of the physical appearance of the proposed development, the technology intended to be used, resources used and waste generated, service infrastructure and construction activities.
Chapter 8	**Assessment of Potential Impacts** Describes and assesses the potential impacts of the proposed development. Mitigation measures relevant to the planning; design, construction and operational phases of the proposed development as appropriate and recommended.
Chapter 9	**Conclusions and Recommendations** Provides conclusions to the impact assessment and evaluates the overall suitability of the proposed development. Recommendations for implementation during the further planning, design, construction and operation of the proposed development are also provided, as appropriate.
Chapter 10	**References** Provides detail on the information referenced in the document.

CHAPTER 2 PROJECT TEAM AND EXPERTISE

2.1 ROLE PLAYERS

The role players in this project are set out in Table 2.1.

Table 2.1: The role players

ORGANISATION	PROJECT ROLE
Directorate of Environmental Affairs	Decision-making authority for environmental authorization
Mr JG Myburgh	Proponent / Client
Urban Green cc	Independent Environmental Consultant (EAP)
Urban Green cc	Public participation
Environment and Wildlife Consulting Namibia	Baseline Ecology Information
Dynamic Water Resources Management	Baseline Hydrogeological Assessment

2.2 EXPERTISE OF THE EAP AND EIA SPECIALISTS

The qualifications and expertise of the environmental consultants and specialists are set out in Table 2.2 below. A more detailed CV can be found in Appendix H.

Table 2.2 – Qualifications and expertise of the environmental consultants

NAME	**Urban Green cc (Mr Brand van Zyl)**
Responsibility on the Project	EAP; public consultation
Qualifications	M. Degree in Environmental Management; M. Degree Town and Regional Planning; Bachelor of Arts Urban Geography
Professional Registration	Namibian Council for Town and Regional Planners Member of the Green Building Council of South Africa
Experience in years	12
Experience	Brand van Zyl has been involved in various Environmental Impact Assessment studies throughout Namibia and of different kind.
NAME	**Mrs Ilze Rautenbach**
Responsibility on the Project	EAP Impact assessment and mitigation formulation; reporting and

	application for Environmental Clearance
Qualifications	M. Phil Degree in Environmental Management; Bachelor of Science Degree in Conservation Ecology; and a Certificate in Project Management
Professional Registration	Ordinary Member: Reviewer and Lead Practitioner, Environmental Assessment Professional Association of Namibia (EAPAN) Certified Environmental Assessment Practitioner, Environmental Assessment Practitioners Association of South Africa (EAPASA) Professional Member, Southern African Institute of Ecologists and Environmental Scientists (SAIEES)
Experience in years	10
Experience	ilze Rautenbach has been involved in various Environmental Impact Assessment studies.
NAME	**Environment & Wildlife Consulting (Mr Peter Cunningham)**
RESPONSIBILITY ON THE PROJECT	Baseline Ecology Information
QUALIFICATIONS	BSc, BSc Hons & MSc Nature Conservation
PROFESSIONAL REGISTRATION	None
EXPERIENCE IN YEARS	20
EXPERIENCE	Peter Cunningham has been involved as consultant for various specialist ecological studies (vertebrate fauna and/or flora) for a variety of EIA's in Africa (e.g. Namibia, Angola & Tanzania) and Arabia (e.g. UAE & Saudi Arabia).
NAME	**Dynamic Water Resources Management (Mr Otto Jansen van Vuuren)**
RESPONSIBILITY ON THE PROJECT	Baseline Hydrogeological Assessment
QUALIFICATIONS	B.Sc (Hons), Graduate Course in Hydrology and Water Resources
PROFESSIONAL REGISTRATION	Namibia Hydrogeological Association (no official registration authority in Namibia)
EXPERIENCE IN YEARS	22 years
EXPERIENCE	Identifying, investigating, developing and evaluating groundwater sources throughout Namibia for rural water supply, resettlement programs, farming and municipal water supply and irrigation schemes. Compilation of water resources management plans (e.g. national

	IWRM plan for Namibia) and environmental impact assessments (egg. SEA for uranium mines), with specific emphasis on the role of groundwater.

CHAPTER 3 STUDY APPROACH AND METHODOLOGY

The EIA process is a planning, design and decision-making tool used to demonstrate to the responsible authority (the Ministry of Environment and Tourism (MET)), and the project Proponent (Mr JG Myburgh), what the consequences of their decisions will be in biophysical and social terms. As such, it identifies potential impacts (negative and positive) that the proposed development may have on the environment; as well as identifying potential opportunities and constraints the environment may pose for the proposed development.

The Terms of Reference (Section 1.2) and relevant legislation as discussed below guided this study's approach and methodology. This chapter provides an overview of the framework for environmental management in Namibia, the EIA process and methodology followed as part of the Scoping Study.

3.1 NAMIBIAN LEGAL FRAMEWORK FOR EIAS

The Environmental Assessment Policy adopted in Namibian Government in 1995 aims to ensure that the aims and objectives of sustainable development concerning the natural resources and the biophysical environment is achieved and maintained. To realise this, the Government has developed and adopted policies, promulgated Acts, and set up structures within Ministries, such as the Directorate of Environmental Affairs in the Ministry of the Environment and Tourism, to deal with various environmental issues.

Key legislation applicable to the general requirements of responsible and sustainable development and the EIA process is discussed below.

3.1.1 THE CONSTITUTION OF THE REPUBLIC OF NAMIBIA (1990)

Namibia's environmental policies are based on the requirements of the Namibian Constitution to endorse the concept of sustainable development. The Constitution of the Republic of Namibia (1990) is the starting and guiding supreme legislation were the country commits itself to sustainable development through environmental protection and wise resource management.

Article 95 (1), Promotion of the Welfare of the People, puts forward this intention as follows:

> *"…the State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at… maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future.*"

In accordance with the Constitution, the national government has formulated policies, development plans (such as Vision 2030, NDP's, etc.) and legislation directed at sustainable development.

In accordance with the Constitution, it is thus necessary and important that the proposed development be in support to these national goals. The concern for sustainable use of natural resources (i.e. water) is a concern raised and requires careful planning and innovative technology to support the goals of the Constitution.

3.1.2 ENVIRONMENTAL MANAGEMENT ACT (ACT 7 OF 2007)

The Environmental Management Act (No 7 of 2007) (EMA) was promulgated in December 2007 and commenced on 6 February 2012 (Government Notice 28 of 6 February 2012) along with the promulgation of the Environmental Impact Assessment Regulations (No. 30 of 2012). It is administered by the Directorate of Environmental Affairs (DEA), under the auspices of the Ministry of the Environment and Tourism.

Its main objectives capture the essence and importance of this particular legislation, which are to:

- Ensure that the significant effects of activities on the environment are considered in time and carefully;
- Ensure that there are opportunities for timeous participation of interested and affected parties throughout the assessment process; and
- Ensure that the findings of an assessment are taken into account before a decision is made in respect of activities.

In Section 3(2) of the EMA, a set of principles are established which give effect to the provisions of the Constitution for integrated environmental management. Although these principles are not enforceable, it is incumbent upon decision makers to consider them when deciding on the approval of a project.

The EMA stipulates that no party, whether private or governmental, can conduct a listed activity without an Environmental Clearance Certificate to be obtained from the Environmental Commissioner (Section 27.3). Depending on the type of activity/ies being applied for, the Commissioner may request that an Environmental Impact Assessment be conducted. Section 27(2) of the Act makes reference to the *List of activities that may not be undertaken without an Environmental Clearance Certificate* (GN. No. 29 of 2012). The following listed activities are applicable to the proposed project.

Table 3.1 - Listed activities as per Government Notice 29 of 2012 applicable

Activity No.	Activity Description
WATER RESOURCE DEVELOPMENTS ACTIVITIES	
Section 8.5	Construction of dams, reservoirs, levees and weirs.
Section 8.6	Construction of industrial and domestic wastewater treatment plants and related pipeline systems.
Section 8.9	Construction and other activities within a catchment area.
INFRASTRUCTURE ACTIVITIES	
Section 10.1	The construction of- (a) oil, water, gas and petrochemical and other bulk supply pipelines; and (b) public roads.

The EMA under Section 56 provides for the EIA Regulations (No. 30 of 2012), which guides and regulates the assessment process to be conducted for the listed activity/ies and application for an Environmental Clearance Certificate.

Section 3(2)(l) states that *"damage to the environment must be prevented and activities which cause such damage must be reduced, limited or controlled"*. If such pollution cannot be prevented then appropriate measures must be taken to minimise or rectify such pollution.

The Proponent and appointed consultants and contractor have the responsibility to ensure that the Project as well as the EIA process conforms to the principles of the Environmental Management Act (No. 7 of 2007). In conducting the EIA, Urban Green cc, have been cognisant of this need, and accordingly the EIA process has been informed by the underlying principles of the Act.

Section 56 of the Act further stipulates the EIA Regulations that apply to an Environmental Impact Assessment, as set out in Government Notice No. 30 of 6 February 2012. Public consultation as specified in Regulations 21, 22 and 23 of the Act forms a very important aspect of the entire impact assessment process.

3.2 SCOPING AND EIA PROCESS

The purpose of this Environmental Impact Assessment (EIA) is to provide information on the nature and extent of potential environmental and social impacts arising from the construction and operation of the proposed project and possible activities taking place concurrently.

The EIA process consists of two phases, namely a Scoping phase and an Impact Assessment phase. A flowchart indicating the EIA process is presented in Figure 3.1 below.

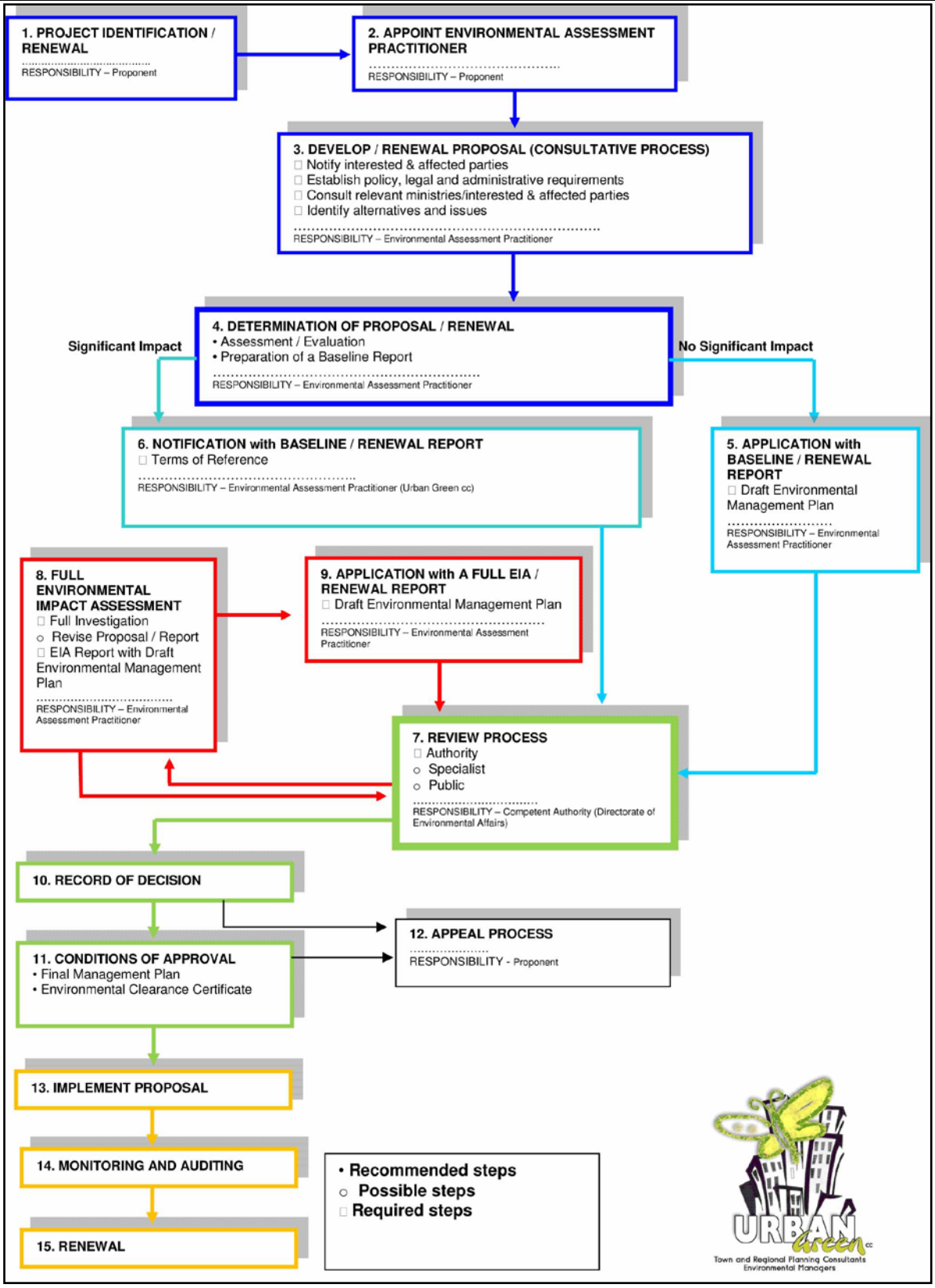


Figure 3.1 – The EIA process

3.2.1 SCOPING STUDY PHASE

Scoping is a critical, early step in the preparation of an EIA. The scoping process identifies the issues that are likely to be of most importance during the EIA and eliminates those that are of lesser concern. The Scoping Study is the first phase of the EIA process and has an emphasis on public involvement. I&APs play an important role in the process, in identifying concerns and issues and to ensure development is as environmentally acceptable as possible.

The project was first registered with the Directorate of Environmental Affairs (the Competent Authority) with the Ministry of Environment and Tourism (MET) on 26 July 2015. Public participation for purpose of the 1st round took place during July/August 2015, while the 2nd round of consultation took place during October 2015.

Scoping Study objectives

The objectives of the Scoping Study were as follows:

- To provide reasonable opportunity for the involvement of I&APs (including relevant authorities) in the study;
- To ensure that all potential key environmental issues and impacts that would result from the proposed development are identified;
- To identify any potential environmental issues and impacts related to the proposed development requiring further investigation in the EIA;
- To identify feasible alternatives related to the development proposal;
- To inform the way forward in the EIA process; and
- Through the above, to ensure informed, transparent and accountable decision-making by the relevant authorities.

Scoping Study Process Undertaken

The Scoping Study has followed the requirements of the Environmental Management Act (Act 7 of 2007) and the EIA Regulations, and has included a full public participation process. A summary of tasks undertaken to date ensure adequate public consultation during the Scoping Study and are described in more detail in Chapter 6 and Appendix B, the Public Participation Process (PPP).

Issues & Concerns Raised During the Scoping Phase

Much like similar other developments especially Estates within the larger Windhoek or Khomas Regional areas, strong concern was raised by Namwater with regards to (i) continues water supply (demand) to growing developments surrounding Windhoek; (ii) the potential pollution impact on the Friedenau Dam and downstream surface water and groundwater resources (boreholes); (iii) waste management; and (iv) increased traffic on the gravel roads.

Other concerns raised in particular were the loss of biodiversity by quarrying for gravel when constructing roads, as well as the introduction of invasive/alien plants (i.e. gardening).

Way Forward in the EIA Process

The following steps are envisaged for the remainder of the EIA process:

- Submission of the FSR to the Directorate of Environmental Affairs for consideration and decision-making;
- After the issuing of the Directorate's decision all I&APs and stakeholders on the project database will be notified of the outcome of the application, as appropriate; and
- A statutory appeal period in terms of Part X, Section 50 of the EMA will follow the issuing of the decision (Clearance Certificate).

CHAPTER 4 LEGISLATION APPLICABLE TO THE PROPOSED DEVELOPMENT

Any type of development has as the result of the construction and operational phases certain legislation to be adhered to. There are a number of sectorial laws that fall under the general rubric of environmental laws. Sectorial laws are generally applicable to specific sectors such as forestry, water, mining and so forth. A number of Namibian Legislation and policies have environmental considerations in respect of operations to be carried out in most development initiatives in Namibia as listed below.

This section reviews the legislation, as they are applicable to the construction and operational phases of the proposed development.

4.1 NAMIBIAN SECTORAL LEGISLATIVE REQUIREMENTS

4.1.1 WATER RESOURCES MANAGEMENT ACT (ACT NO 11 OF 2013)

This Act stipulates conditions to ensure that proper wastewater treatment is provided and operated to ensure that effluent produced are of certain standard. It also controls the disposal of sewage, the purification of effluent, the prevention of surface and groundwater pollution, and the sustainable use of water resources.

The Act's Regulations provides for water pollution control and the purpose is to control wastewater discharge to ensure that no surface-, ground- or seawater is polluted in such a way that it becomes less fit for purposes for which it would ordinarily be used, or for sustaining aquatic life or for recreational or any other legitimate purpose. These Regulations is an extension to the Water Resources Management Act (Act 11 of 2013), and all subsequent amendments.

The following sections of the Act are of importance to the proposed development and are thus included in this Scoping Report for action by the Proponent before construction of the prosed Kuiseb Country Estate can commence.

Section 77: Licenses are required from the Department of Water Affairs and Forestry (DWAF) for treatment of effluent, and for the drilling of boreholes. The Water Act (Act 54 of 1956), see below, also stipulates that no wastewater, effluent or waste shall be discharged without a licence issued by the Minister *[Refers to Sections 105 and 107 of the Water Act (Act 54 of 1956)].*

Given the intention to install a Clarus Fusion Waste Water Treatment Plant the following need to be obtained from the Department of Water Affairs and Forestry:

- A licence to treat wastewater to the standards and guidelines set out in Section A4 of the Act.
- A licence to construct and operate a wastewater treatment plant, including the obligation to maintain the plant as set out in Section A3 of the Act.
- A license to discharge the treated wastewater after treatment and to make it available for re-use.
- A license to re-use wastewater derived sludge for purposes agreed to with the Minister, with the obligation to strictly adhere to the conditions specified.

Subject to the Water Resources Management Act (Act No. 11 of 2013), the General Guidelines (July 2008) developed by the Department of Water Affairs and Forestry addresses treatment of wastewater by means of different systems. It includes design information and strives to present information that may be helpful to owners and operators of a particular system (e.g. Biological Filtration System, Pond System, Septic Tank System, and Biological Treatment Activated Sludge Process), individuals performing compliance inspections, sampling and writing or assessing technical reports on which permit conditions are based.

This Act will partially the Water Act (Act No. 54 of 1956) once it is implemented by Government.

4.1.2 WATER ACT (ACT 54 OF 1956)

This Act partially replaced by the Water Resource Management Act, consolidate and amend the laws relating to the control, conservation and use of water for domestic, agricultural, urban and industrial purposes. The main purpose of the Water Act is to provide for the sustainable development and use of water resources, and restricts the pollution of waters by means of any activity.

This Act requires the proposed development to investigate and implement measures to ensure sustainable use of water resources and ensure that no pollution of any above or below ground water takes place.

4.1.3 WATER & SANITATION POLICIES

The existing water and sanitation policies in place are the National Water Policy (NWP) adopted in 2000 the Water Supply and Sanitation Sector Policy (WSASP) which was adopted in 2008 and the National Sanitation Strategy of 2009, which is based on this WSASP policy.

In terms of the Act and the **Water Supply and Sanitation Policy**, the developer will:

- Take steps to prevent “any public or private water on or under that land, including rainwater that falls on or flows over or penetrates such land” from being polluted.
- Require a permit for the disposal of effluent and industrial wastewater.

Of particular concern is the prevention of surface- and groundwater pollution, therefore the collection, storage, disposal and re-use of sewage- and storm water is of utmost importance.

In terms of the **National Sanitation Strategy 2010/11 – 2014/15**, the developer must put in place strategies:

- Guaranteeing safe and affordable sanitation, encouraging decentralised sanitation systems where appropriate.
- That should promote recycling through safe and hygienic recovery and use of nutrients, organics, trace elements, water and energy, and the safe disposal of all human and other wastes, including sewage and industrial effluent, in an environmentally sustainable fashion.

4.1.4 ATMOSPHERIC POLLUTION PREVENTION ORDINANCE (NO 11 OF 1976), AS AMENDED

This Ordinance generally provides for the prevention of the pollution of the atmosphere. Part IV of this ordinance deals with dust control and provides for the proclamation of dust control areas. The entire area of Namibia, with the exception of the east Caprivi Strip is classified as a controlled area, as laid out in section 4(1)(a) of the Ordinance (GN 309/1976).

The Ordinance is clear in requiring that –

(1) Any person who in a dust control area –

(b) has at any time or from time to time, whether before or after the commencement of this Ordinance, deposited or caused or permitted to be deposited on any land a quantity of matter which exceeds, or two or more quantities of matter which together exceed, twenty thousand cubic metres in volume, or such lesser volume as may be prescribed, and which in the opinion of the Director causes or is liable to cause a nuisance to persons residing or present in the vicinity of such land on account of dust originating from such matter becoming dispersed in the atmosphere.

The activities associated with this development is not expected to cause any severe dust pollution, apart from the construction activities (temporary) and vehicle movement on the gravel roads until the roads are upgraded and tarred.

Care should further be taken during the construction phase to limit the dust pollution from the development site given the existence of other activities in the area and for the fact that it could be categorized as causing a public nuisance under common law.

4.1.5 DRAFT POLLUTION CONTROL AND WASTE MANAGEMENT BILL (JULY 1999)

The Bill relates to preventing and regulating the discharge of pollutants to the air, water and land; and to regulate noise, dust and odour pollution; and establish a system of waste planning and management. Reference is also made to hazardous substances being a parcel duplication of what is covered in the Hazardous Substance Ordinance.

The Bill amalgamates a variety of Acts and Ordinances, mainly inherited from the South African administration, that provide protection for particular species, resources or components of the environment. The Bill has relevance to the proposed development considering the aspects of potential water and dust pollution in the event of poor practices.

This Bill will be rewritten and is widely accepted that the draft Bill will change dramatically.

4.1.6 PUBLIC HEALTH ACT (ACT NO 36 OF 1919)

The Act covers a variety of aspects with relevance to the general wellbeing and health of the public. With relevance to the development and associated infrastructure this Act refers to the control of nuisance, but also the prevention of pollution of public waters.

Section 119 of this Act prohibits the existence of a 'nuisance' on any land owned or occupied by any person. Having relevance to the proposed development, the Act defines 'nuisance' as:

- *any stream, pool, lagoon, ditch, gutter, watercourse, sink, cistern, water closet, earth closet, privy, urinal, cesspool, drain, sewer, dung pit, slop tank, ash pit or manure heap so foul or in such a state or so situated or constructed as to be offensive or to be injurious or dangerous to health;*
- *any other condition whatever which is offensive, injurious or dangerous to health.*

No real nuisance as per the definition above is associated with the proposed development *as such*, but care should however be taken during the construction phase to limit the dust pollution from the development site given the closeness to other residential, recreational and or tourism activities and the fact that it could be categorised as causing a public nuisance under common law.

Part III of the General Regulations promulgated under the Health Act (Act 36 of 1919) focus on the prevention of pollution of public waters by various means. If correctly operated very little opportunity exists for any public waters to be polluted, but still requires caution during the construction and operational phase of the proposed development.

4.1.7 NATURE CONSERVATION ORDINANCE (NO 4 OF 1975), AS AMENDED

This Ordinance covers game parks and nature reserves, the hunting and protection of wild animals (including game birds), problem animals, fish, and of importance to the proposed development

affords protection of certain indigenous plant species. It is administered by the Ministry of Environment and Tourism and provides for the establishment of a Nature Conservation Board. The Ordinance includes a number of schedules listing threatened and endangered species of plants and wild animals. If any of these are identified as being affected by the proposed development, a permit may have to be obtained.

In accordance with the Baseline Ecology Information provided for the immediate surrounding area, the site may accommodate some of the protected species (see Section 5.6.7) as listed in Schedule 9 of the Ordinance. Given the likely existence of some protected species found onsite it is recommended to conduct an on-site vegetation survey to identify these species to be included in the proposed development's layout pre-construction starts.

4.1.8 FOREST ACT (ACT 12 OF 2001), AS AMENDED

The Act deals with forests in general and matters incidental thereto. Of importance to the proposed development is that the Act affords general protection of the environment (Part IV). Section 22 affords protection to natural vegetation stipulating that no living tree, bush or shrub within 100 m from any river, stream or watercourse may be removed without the necessary license. Permits are required for the removal of trees, bushes or shrubs, or any indigenous plants.

The proposed residential development lies within the Kuiseb River catchment, and also within the catchment of the Friedenau Dam that currently supplies water to the Baumgartsbrunn development. The Kuiseb River alluvial is a significant source of water supply to commercial farmers, and it also hosts bulk water supply schemes further downstream, supplying water to places as far as Gobabeb and Walvis Bay.

Before construction commences it is recommended to conduct an onsite-vegetation survey to ensure that all protected species found in these river catchments are avoided as far as possible. In the event that these species need to be removed, the necessary permits need to be obtained from the Ministry of Agriculture, Water and Forestry.

4.1.9 SOIL CONSERVATION ACT (ACT 76 OF 1969), AS AMENDED

Partially similar to the other acts and ordinances above, this Act addresses the issues of vegetation and ground water, but also includes the matter of soil. In specific the Act focuses on combating and preventing soil erosion; the conservation, protection and improvement of soil and vegetation and water sources and resources.

The eastern portion (Portion A), upon which the proposed Country Estate will be developed, comprise of undulating terrain with very steep slopes found within the eastern section overlooking the Kuiseb River. The property contains two outcrops within a rolling hill landscape which is quite prominent with smaller watercourses that drain the Portion towards the Kuiseb River, which drains into the Friedenau Dam.

The soil mostly consists out of mica schists and is further covered in pebble mulch, which contains mica, quarts and very little soil. With good vegetation cover it is not prone to erosion, but special care needs to be taken during the construction phase when clearing takes places when there is not much vegetation to ground the soil form eroding. In addition the slope towards the Kuiseb River in the east will need to be carefully managed during construction so that erosion is minimised as well as potential water runoff.

4.2 OTHER RELEVANT LEGISLATION & APPROVALS REQUIRED

4.2.1 OTHER RELEVANT LEGISLATION & POLICIES

Other relevant legislation and policies relevant to the EIA and proposed development include, but are not limited to, the following:

- Nature Conservation Ordinance, (Ordinance 4 of 1975), covers game parks and nature reserves, the hunting and protection of wild animals (including game birds), problem animals, fish, and the protection of indigenous plants.
- Petroleum Product and Energy Act (Act 13 of 1990), as amended provides for specific standards for the storage of petroleum products, and in this case Diesel. It further provides general duty with regards to fires, explosions as well as possible spills and leakages.
- National Heritage Act (Act 27 of 2004) ensures the protection of cultural and archaeological sites. The Act requires the identification of cultural and archaeological sites within the study area, registration and protection thereof.
- Labour Act (Act 6 of 1992), cover occupational exposure to employees.
- Agricultural Land Act (Act No. 70 of 1970), controls the subdivision of agricultural land.

4.2.2 PERMITS, LICENCES AND/OR APPROVALS REQUIRED

Given the proposed development, the following permits and/or licence (Table 4.1) may also be required before the development may become fully operational:

Table 4.1 – Permits and/or licence that are required

Activity	Type of Permit / Licence	Legislation / Institute
Electricity connection to the Portion	Approval	NamPower
Water connection to the portion	Approval	NamWater
Water abstraction (borehole)	Approval	Water Resources Management Act (Act 11 of 2013) Ministry of Agriculture, Water and Forestry.

Access from the DR1418 road.	Approval	Roads Authority
Removal of protected and indigenous species	Permit	Forest Act (Act 12 of 2001) Ministry of Agriculture, Water and Forestry
Storage of more than 600 litres of Diesel on site (if applicable)	Consumer Installation Certificate	Petroleum Product and Energy Act (Act No. 13 of 1990), as amended. Ministry of Mines and Energy
Construction and operation of waste water treatment facility	Approval (design)	Water Resources Management Act (Act 11 of 2013) Ministry of Agriculture, Water and Forestry.
Treatment of effluent and discharged of treated effluent	Licenses	Water Recourses Management Act (Act 11 of 2013) Ministry of Agriculture, Water and Forestry
Quality of treated effluent	Permit	Water Resources Management Act (Act 11 of 2013) Ministry of Agriculture, Water and Forestry.
Solid waste removal system (if applicable)	Approval	Department Infrastructure, Water and Waste Management. Solid Waste Management Division, KRC
Subdivision of farm land	Approval	Ministry of Agriculture, Water and Forestry

It would be the responsibility of the Proponent to obtain all the necessary and relevant additional permits and/or licences before operation of the activity/s may commence.

CHAPTER 5 THE AFFECTED ENVIRONMENT

This chapter describes the details pertaining to the Site's locality and characteristics of the surrounding area, as well as the existing biophysical, socio-economic and cultural-historic characteristics. The description has been compiled based on secondary information, the specialist's input and a site visit.

5.1 LOCALITY AND SIZE

The Remainder of the Farm Landmister No 331 is situated approximately 52 km south-west of Windhoek, just north of the Friedenau Dam, in the Khomas Region (see Figure 1.1 - Locality Map). The Farm is situated outside of the municipal jurisdictional area of the City of Windhoek. The Farm falls within the jurisdictional boundary of the Khomas Regional Council.

The portion to be developed (Portion A) is situated adjacent to the east of the DR1418 road that passes through the Farm. DR1418 dissects the Remainder of the Farm Landmister No 331 into two portions of which the smaller eastern portion (Portion A) is only 400ha in extent.

Access to the Farm and the smaller eastern portion is obtained via existing accesses of the DR1418 road, which is again linked with the C28.

5.2 SURROUNDING ACTIVITIES

The surrounding area in close proximity to the Farm, contains a variety of other types of activities (i.e. tourism; educational; commercial) and is not exclusively agriculture anymore.

The few farms situated to the south of the C28/DR1418 intersection have taken-on a variety of other uses. The DR1418 forms a central spine within a slowly expanding development axis leading southwards from the existing Baumgartsbrunn Farm towards the Friedenau Dam situated on Portion 1 of the Farm Colvania No. 287, located to the south of the Remainder of the Farm Landmister No 331 (Figure 5.1).

A variety of activities are located at the mentioned intersection and along this spine, which includes the Agricultural Technical Centre (Farm Otjompaue No. 471), a clinic, school and airstrip (Farm Baumgartsbrunn No. 15), wholesale nursery (Farm Rem. Neuheusis No. 332), and tourism facilities (i.e. picnic, camping, fishing, non-motorised water sports) at the Friedenau Dam (Portion 1 of the Farm Landmister No. 331) and Hochland Nest Lodge (Farm Colvania No. 287) situated south of the Friedenau Dam (Figure 5.1).

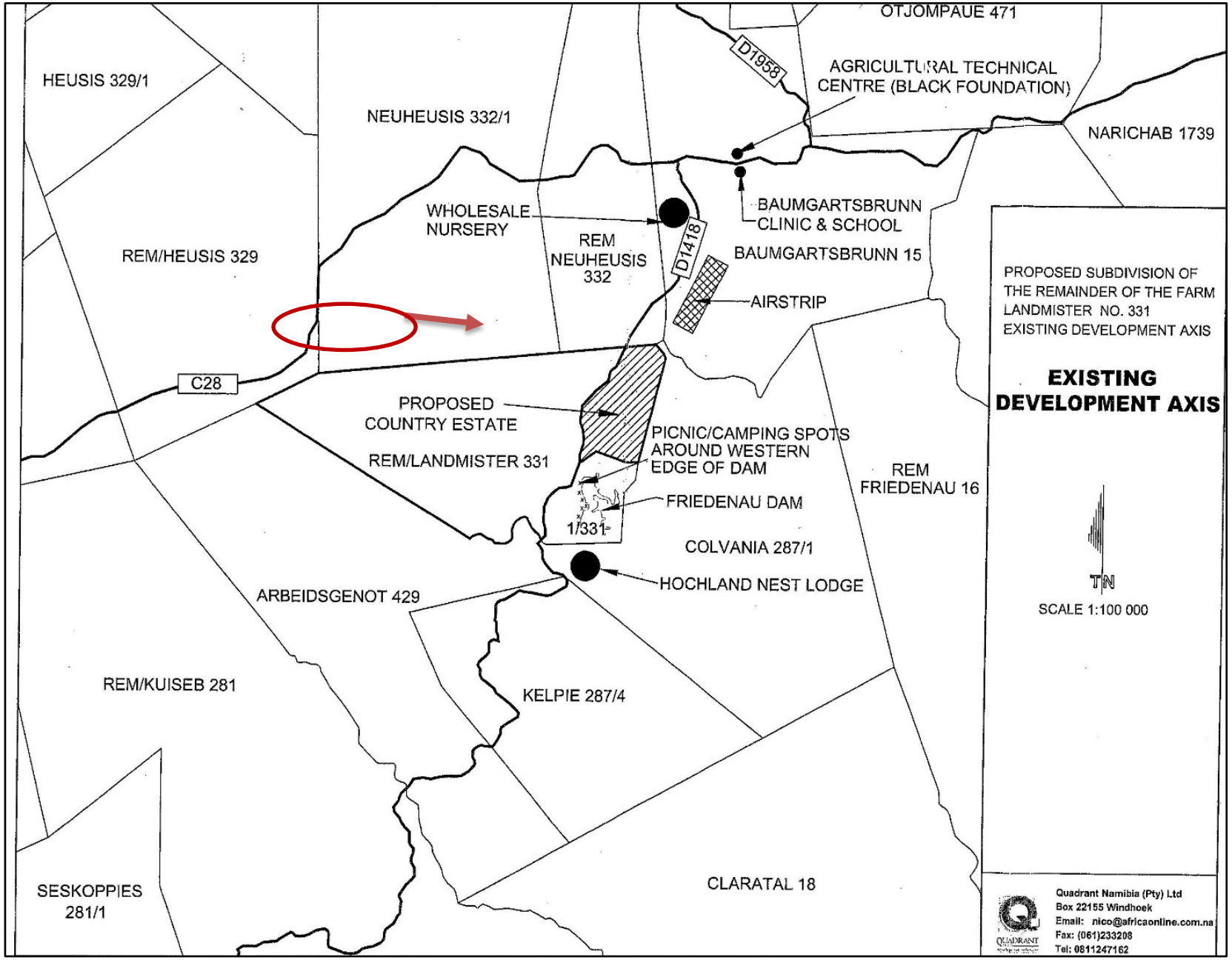


Figure 5.1 – Activities within the larger surrounding area *(© Quadrant Namibia (Pty) Ltd)*

Photo 5.1 – Activities along the DR1418 road

5.3 BULK SERVICE INFRASTRUCTURE

The area presents a variety of well-developed infrastructure services.

5.3.1 ELECTRICITY INFRASTRUCTURE

Nampower services the larger area by way of overhead power lines. The Remainder of the Farm Landmister No 331 is serviced with electricity from Nampower. No electricity infrastructure exists at proposed Portion A to accommodate the Kuiseb Country Estate.

5.3.2 WATER INFRASTRUCTURE

The majority of farms within the area extract water from boreholes or from self-made gravel dams. An underground bulk water supply line (Namwater) transferring water from the Friedenau Dam to other users to the north are located along the DR1418 road, forming the western boundary of proposed Portion A on which the Kuiseb Country Estate is intended.

The Remainder of the Farm Landmister No 331 obtains water from boreholes and gravel dams. No borehole or gravel dam exists at proposed Portion A to accommodate the Kuiseb Country Estate.

5.3.3 ROAD ACCESS

Access to the Farm is obtained directly from the C28, while the eastern portion (Portion A) of the Farm obtains access via the DR1418 road, which is again linked with the C28. The DR1418 road forms the western boundary of the proposed development (i.e. Portion A).

5.3.4 WASTEWATER INFRASTRUCTURE

No main sewer reticulation network exists within the larger area. Privately owned and operated septic tanks with soakaways are still almost exclusively used by all residents in the area.

5.3.5 SOLID WASTE DISPOSAL

Each owner treats solid waste individually and no integrated waste removal system exists for the area.

5.3.6 TELECOMMUNICATION INFRASTRUCTURE

The majority of Farms are connected to Telecom Namibia's grid. Various base transmitter stations are situated throughout the larger area, which provides wireless telecommunication services.

5.4 SOCIO-ECONOMIC ENVIRONMENT

The socio-economic character of the surrounding area is still mainly agricultural farmland with commercial cattle farming being the most prominent activity. The area enjoys vast open landscapes with 360 degree views over the majestic rolling hills of the Khomas Hochland Mountains as well as the Friedenau Dam.

This particular area in close proximity to the Farm, contains a wide variety of other types of activities (i.e. tourism; educational; commercial) and is not exclusively agriculture anymore (see Figure 5.1). The socio-economic characteristics started changing as more socio-economic activities established within the area along the DR1418. The DR1418 now forms a central spine within a slowly expanding development axis leading southwards from the existing Baumgartsbrunn Farm towards the Friedenau Dam situated on Portion 1 of the Farm Colvania No. 287, which is located south of the proposed Kuiseb Country Estate.

A variety of activities are located at the mentioned intersection and along this spine, which includes the Agricultural Technical Centre (Farm Otjompaue No. 471), a clinic, school and airstrip (Farm Baumgartsbrunn No. 15), wholesale nursery (Farm Rem. Neuheusis No. 332), and tourism facilities (i.e. picnic, camping, fishing, non-motorised water sports) at the Friedenau Dam (Portion 1 of the Farm Landmister No. 331) and Hochland Nest Lodge (Farm Colvania No. 287) situated south of the Friedenau Dam.

This change was mainly brought on as a result of some portions of agricultural farmland being economically unviable, presence of the Friedenau Dam in the area (i.e. recreational value) and the economic opportunities arising from the close proximity to the capital city of Windhoek. These socio-economic activities are also generally secondary activities for many of the farmers in the area.

All properties have access to services to a certain extent (i.e. potable water, electricity, roads, and sewer), either provided by the authorities (i.e. Namwater, Nampower, Roads Authority) or self-provided. Access to some institutional services (i.e. schools, clinics, etc.) is available in the larger area, but most of the residents depend on these services situated in Windhoek.

5.5 CULTURAL, ARCHAEOLOGICAL & HERITAGE

Khomas as a Region and Windhoek as a city played a central part in the historical evolution of Namibia as a Country. The area known as *Aie//gams* (hot springs or place of steam) was inhabited first by the Dammars, Hereroes and Namas long before German rule, followed by South African rule.

The Khomas Hochland plateau has some medium and high local site densities, characterized by evidence of rock art, metallurgy and some traces of Pleistocene occupation (Kinahan, 2013). Given this rich historical background of the Khomas Hochland and Windhoek areas, it can be expected that the area of Kuiseb River and the area surrounding the study area might have had some historical role to play or value. However, the area surrounding the Friedenau Dam is not known to have any historical significance prior or after Independence in 1990.

No record of any cultural or historical importance or on-site resemblance of any nature could be located as part of this study.

5.6 VISUAL AESTHETICS

The area enjoys vast open landscapes with 360-degree views over the majestic rolling hills of the Khomas Hochland Mountains as well as the Friedenau Dam (Photos 5.2 & 5.3).

The particular portion (Portion A) is still within a very pristine and unspoiled state, bearing some resemblance of past agricultural activities.

Photo 5.2 – South-easterly view of Portion A from the DR1418

Photo 5.3 – South-easterly view of the Friedenau Dam from the south-western part of proposed Portion A of the Farm

Sense of place within the immediate area is still of a rural nature defined by larger open areas, with a slight intrusion of urban like activities at certain places along the DR1418.

Due to the majestic rolling hills of the Khomas Hochland Mountains rising-up over the horizon, the beauty and attraction to the Friedenau Dam and the visual significance of the undulating pristine setting, are all prominent features that supported the decision to develop the Kuiseb Country Estate at the particular locality. Special care must therefore be taken with the design of the proposed development (i.e. buildings and infrastructure) not to detract from this natural beauty.

Special consideration should be taken in the architectural design, placement of houses, building materials and colours to be used for the construction of the dwellings in order to support the visual aesthetics of the current landscape.

5.7 BIOPHYSICAL ENVIRONMENT

Details with regards to the status of the biophysical environment in and surrounding the Site (Portion A) are presented below.

5.7.1 CLIMATE

The Kuiseb / Friedenau Dam area is situated within the Khomas Hochland Plateau and has an arid climate typified as very hot and dry in summer and moderate dry winters. As a result the area has a fairly low frost potential, occurring more regular on the bottom of low-lying valleys within the Windhoek Basin.

The average annual rainfall for Windhoek and surroundings is 250 – 360mm while the average evaporation rate is in the region of 3 400mm a year (Atlas of Namibia, 2002). Rainfall is highly erratic and unpredictable over the larger part of the entire Khomas Hochland Plateau, with the highest rainfall months being January to March.

During winter months, the average minimum temperature is 6ºC, while the average maximum day temperature is 20ºC. Summers are hot and dry with the highest annual rainfall falling between January and March. The average minimum temperature is around 10ºC and the average maximum temperature around 31ºC during the warm summer months.

Easterly winds predominate (22%) throughout the year, followed by north-easterly (10%) and westerly (12%) winds.

Given the nature of the proposed development, it is not expected that the climate will have any significant effect and vice versa.

5.7.2 GEOLOGY AND SOILS

The bedrock geology of the area consists primarily of highly deformed rocks of the Kuiseb Formation rocks of the Swakop Group. The dominant lithologies are metagreywacke and mica schist. The Matchless amphibolite belt is located just to the south of the Hochland Nest Lodge.

Structures present in the *larger area* are mainly north-south faults and joint systems. The north-south fault systems are less developed in the micaceous lithologies of the Kuiseb Formation rocks, as the mica schist undergoes plastic deformation rather than brittle fracturing. Based on the

geological map of Namibia, no faults are mapped within the farm boundaries, while a few faults are mapped to the east of the farm.

The predominant geology is the determining factor in the behaviour and characteristics of the geohydrological environment. The underlying geology is primarily schist, which is considered having a low groundwater potential and low risk of groundwater contamination. Along drainage channels and rivers, alluvium may be found which have a moderate to high groundwater potential, with an associated higher risk of groundwater pollution.

All information suggests that the area in general however has poor groundwater potential and the predominant geology in the area results in very little risk of groundwater contamination, *unless* pollutants end up in geological structures acting as preferential groundwater flow paths (faults or open joints) or along the river courses (Kuiseb River to the east of the site) where groundwater flow in the alluvial sediments will be higher. Under such conditions the transmissivity is higher; therefore the potential to easily transmit pollutants can also be moderate to high (Hydrogeological Baseline Assessment, Appendix C).

5.7.3 TOPOGRAPHY AND DRAINAGE

The larger Khomas area is characterised by the rugged higher lying undulating mountainous zone situated to the east and west and the central lying lower lying lowlands. The Otjihavera mountain range forms the eastern boundary, while the Khomas Hochland (including the Nubuamis Mountain) forms the western boundary. Steep slopes exceeding 30^{o} are characterized by exposure of rocky outcrops and patchy soil and vegetation, while the lowlands ($5 – 30^{o}$) act as interface between the high altitude and the riparian alluvial fans that form the river system.

The proposed Kuiseb Country Estate development lies within the Kuiseb River catchment, and also within the catchment of the Friedenau Dam that currently supplies water to the neighbouring Baumgartsbrunn development. The Kuiseb River alluvials is a significant source of water supply to commercial farmers in the area and it hosts bulk water supply schemes further downstream, supplying water to Gobabeb and Walvis Bay. The Kuiseb River is ephemeral in nature and natural flow occurs during the rainy period in the summer season and is dry for the most of the rest of the year (Hydrogeological Baseline Assessment, Appendix C).

The larger part of the Site (Portion A) is located on the western banks of the Kuiseb River, while a small portion is situate to the eastern bank of the Kuiseb River. The fairly straight Kuiseb River flows in a westward direction, appears fault controlled and drains to the Friedenau Dam. Some faults are evident in the larger area surrounding the proposed development, with only one fault cutting through the far eastern part of the proposed new subdivided Portion 15. No faults are mapped within the focus study area.

The Friedenau Dam with a capacity of 6.7Mm^3 is located just south of the proposed development and was initially the main water source for the Matchless Copper Mine situated 20 km west. Currently the Friedenau Dam is solely used for recreational purposes.

The eastern portion of the Farm (Portion A), upon which the proposed Kuiseb Country Estate will be developed, comprise of undulating terrain with very steep slopes found within the eastern section overlooking the Kuiseb River which transverses over Portion A from north to south. Smaller watercourses drain the Portion towards the Kuiseb River, which again drains into the Friedenau Dam to the south.

5.7.4 HYDROGEOLOGICAL

The main aquifer type found in the area is secondary fractured aquifers hosted in the mica schist of the Kuiseb Formation, with limited aquifers formed along the ephemeral river courses that are associated with river alluvials, or where groundwater recharge takes place during flood events.

Schist, being a naturally poor host of groundwater, acts as an aquiclude, or when hosting groundwater, at best as an aquatard. The weathering product of schist is clayey material, which also is not favourable for transmitting groundwater.

Recharge to the fractured aquifers occurs through percolation during and after rainfall events, or by infiltration through river bed alluvials by means of sub-surface groundwater flow or from surface run-off during times of flooding. Groundwater recharge in this schistose environment is however considered to be insignificant. It is rather perceived that water percolating through the soil horizon will flow on top of the schist to low-lying areas where it will either discharge as baseflow into river courses, or it will be lost through evapotranspiration. Only a (small) portion of this water will infiltrate the schist along foliation planes or into joints, where it will be retained within the clayey weathered schist, while a larger portion can infiltrate quartz veins if the latter are broken.

The Hydrogeological Map of Namibia shows that the study area fall in a zone of rock bodies with little groundwater potential (generally low; locally moderate potential) in an area of metamorphic rocks. Therefore no major geological structures, enhancing groundwater recharge or flow, are evident on the proposed site *unless* pollutants end up along the river courses (Kuiseb River to the east of the site) where groundwater flow in the alluvial sediments will be higher. Under such conditions the transmissivity is higher; therefore the potential to easily transmit pollutants can also be moderate to high (Hydrogeological Baseline Assessment, Appendix C).

5.7.5 FLOOD LINES

Due to the Kuiseb River found quite low in the landscape the potential of flooding should not have an impact if the positions of the dwellings are situated as such to not be within 100m from the edge of the River, as well as on the higher slopes away from the river gauge.

5.7.6 WATER QUALITY

Groundwater in the area is generally of good to high quality. From the Department of Water Affairs groundwater database (GROWAS, February 2011 data) it can be seen that a large number of boreholes exist in the larger area. Positions of existing boreholes in the area are shown in Figure 5 of the Hydrogeological Assessment (see Appendix C). These boreholes are used primarily for domestic and stock watering on farm land, while the Hochland Nest Lodge also abstract water from a production borehole. A few bulk water supply boreholes are located nearer to the Daan Viljoen Game Reserve and Windhoek.

It is important that untreated wastewater from the proposed development should not be permitted to be discharged into the environment. All wastewater produced outside of municipal serviced areas has to be treated to a minimum of general standards and need to conform to the Water Resources Management Act's regulations with the appropriate wastewater discharge licences in place.

5.7.7 ECOLOGY

The general area is commonly referred to as the Highland Savannah/Shrubland with the vegetation structure classified as shrubs and low trees (see Photo 5.4). The terrestrial species (all species) is regarded as average to high while the overall terrestrial endemism is high.

Photo 5.4 – View of the site indicating smaller trees and ground cover

The Highland Savannah, although varied, is classified by *Combretum apiculatum* subsp. *apiculatum* and *Acacia hereroensis*, *Acacia reficiens* and *Acacia erubescens* amongst others and the climax grasses on undisturbed areas dominated by *Anthephora pubescens, Brachiaria nigropedata* and *Digitaria eriantha*.

The average plant production is high to very high with the variation in green vegetation biomass estimated at 10-15%. The overall plant diversity (all species - "higher" plants) in the general area is high and estimated at 400-499 species while the plant endemism is also high with >35 species while the Auas Mountains, east of the proposed development area, have >500 species of which at least 7% are viewed as Namibian endemics. Bush thickening or encroachment is not viewed as an economic problem in the general area. The ephemeral Kuiseb River and its tributaries as well as the Friedenau Dam are important habitats for a variety of species favouring larger trees and open water.

It is estimated that at least 78 reptile, 9 amphibian, 73 mammal, 261 bird species (breeding residents), 66-83 species of larger trees and shrubs (>1m) and up to 101 grasses are known to or expected to occur in the general Friedenau Dam area of which a high proportion (e.g. 35.9% of the reptiles) are endemics.

(i) Tree and Shrub Diversity

It is estimated that at least 66-83 species of larger trees and shrubs (>1m) occur in the general Friedenau Dam area. Twenty seven (32.5%) species of larger trees and shrubs have some kind of protected status in the general area. Five species (6.1%) are endemic, 3 species (3.7%) near-endemic, 16 species (19.3%) protected by various Forestry laws, 3 species (3.7%) protected by Nature Conservation laws and 3 species (3.7%) classified as CITES Appendix II species. The most important larger trees/shrubs are viewed as the various protected species and species of conservation concern and include *Aloe litoralis*, *Commiphora dinteri*, *Cyphostemma bainesii*, *C. currorii* and *Heteromorpha papillosa*.

(ii) Grass Diversity

It is estimated that up to 101 grasses occur in the general Friedenau Dam area of which 4 species are viewed as endemic (*Eragrostis omahekensis*, *Eragrostis scopelophila*, *Pennisetum foermeranum* and *Setaria finite*). Aloes (*Aloe hereroensis*, *A. litoralis* & *A. zebrina*); endemic fern (*Marsilea burchellii*) and species with commercial potential – e.g. devil's claw (*Harpagophytum procumbens*) and tsamma melon (*Citrullus lanatus*) – are also viewed as important.

None of the important flora species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected (should sound ecological principles during the design & construction phase be followed – e.g. indigenous gardening, etc.) by the Kuiseb Estate developments.

(iii) Reptiles

Reptile diversity and endemism in the general Friedenau Dam area is estimated at between 71-80 species and 13-16 species, respectively. According to a literature study conducted for the area at least 78 species of reptiles are expected to occur in the general area with 28 species (35.9%) being endemic. Tortoises are viewed as the group of reptiles most under threat in Namibia making *Stigmochelys pardalis* and *Psammobates oculiferus* probably the most important reptiles followed by the pythons – *Python anchietae* & *P. natalensis* – and monitor lizard *Varanus albigularis*. Another important species potentially occurring in the area – *Cordylus pustulatus* – is only known from the higher regions of the Auas Mountain range and not yet been recorded from the areas to the east of Windhoek. All the above mentioned species (except for *C. pustulatus*) are either consumed as food or indiscriminately killed when encountered.

None of the important reptile species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected (should sound ecological principles during the design & construction phase be followed – e.g. electric perimeter fences avoided) by the Kuiseb Country Estate development.

(iv) Amphibians

Amphibian diversity and endemism in the general Friedenau Dam area is estimated at between 9-12 species. According to a literature study conducted for the area at least 9 species of amphibians can occur in suitable habitat in the general area with 2 species being endemic and 1 species classified as near threatened. The most important species are the endemic *Poyntonophrynus hoeschi* & *Phrynomantis annectens* and *Pyxicephalus adspersus* (near threatened) although they are widespread in Namibia and not exclusively associated with the Friedenau Dam area.

None of the important amphibian species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected (should sound ecological principles during the design & construction phase be followed – e.g. effluent not entering the dam system) by the Kuiseb Country Estate development.

(v) Reptiles

Amphibian diversity and endemism in the general Friedenau Dam area is estimated at between 9-Mammal diversity and endemism in the general Friedenau Dam area is estimated at between 61-75 species and 5-6 species, respectively. According to the literature study conducted for the area at least 81 species of mammals are expected to occur in the general area with 8 species (9.9%) being endemic, 3 species classified as rare and 8 as vulnerable. The most important mammals are those classified as near threatened (e.g. brown hyena & Hartmann's mountain zebra) under international legislation and rare (Namibian wing-gland bat, hedgehog & black-footed cat) under Namibian legislation. Other species of concern include various predators, often persecuted as "livestock thieves" – e.g. cheetah, leopard, African wild cat – and the little known pangolin.

None of the important mammal species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected (should sound ecological principles during the design & construction phase be implemented – e.g. problem animal [baboon, snakes, etc.]; domestic pets and genetic pollution [i.e. African wild cat] issues) by the Kuiseb Country Estate development.

(vi) Avifauna

Bird diversity and endemism in the general Friedenau Dam area is estimated at >230 species and 6-7 species, respectively. Although the area is not classified as an Important Birding Area (IBA) it has a high ranking for southern African endemics and an average ranking for red data birds from Namibia. According to the literature study conducted for the area at least 209 species of terrestrial species ("breeding residents") or 261 species (if aquatic species are included) are expected to occur in the general area which includes 10 of the 14 Namibian endemics. Namibian red data species (25 species) from the area include maccoa duck, violet wood-hoopoe, European roller, Rüppell's parrot, Ludwig's bustard, kori bustard, African fish-eagle, white-backed vulture, Cape vulture, lappet-faced vulture, black harrier, pallid harrier, tawny eagle, Verreaux's eagle, booted eagle, martial eagle, secretarybird, red-footed falcon, peregrine falcon, black-necked grebe, greater flamingo, great white pelican, black stork, saddle-billed stork and marabou stork. The most important birds are viewed as the endemic species, especially Montero's & Damara hornbills, Rüppell's parrot, Rüppell's korhaan as well as the larger raptors of conservation concern – e.g. fish, tawny, martial and Verreaux's eagles.

None of the important bird species is exclusively associated with the Friedenau Dam area. However, the proposed Kuiseb Country Estate and associated developments could potentially negatively affect mainly aquatic species (and their habitats) associated with the Friedenau Dam – e.g. maccoa duck, African fish eagle, etc. – while expected electricity supply structures to the site would have to include bird collision mitigation measures to avoid/minimise collisions (e.g. coils, flappers). Birds potentially affected would include the various larger species migrating/commuting between the Friedenau Dam and other water bodies (e.g. various ducks, great white pelican, greater flamingo, storks and herons); larger raptors (e.g. various eagles and vultures, various owls, including marabou stork) and especially species moving at night (e.g. kori bustard, great white pelican, greater flamingo).

CHAPTER 6 PUBLIC PARTICIPATION PROCESS

This chapter describes in detail the full extent of the Public Participation Process followed. It also includes the main issues and concerns raised during the public consultation process and comments received on the information distributed.

6.1 PUBLIC ENGAGEMENT

6.1.1 FIRST ROUND OF CONSULTATION

Engagement with the public and authorities commenced on the 29th of July 2015. During the first round of consultation, I&APs and Authorities were given an opportunity to register and submit comments/concerns on the Project for a period starting on 29 July 2015 and ending on 19 August 2015.

(i) Activities of Public Engagement

Tasks undertaken to date to ensure adequate public consultation are as follows:

- A pre-identified I&AP and authority database was compiled. A total of 37 I&APs and Stakeholders are included on the database (Appendix B1);
- An onsite notice was placed on the boundary fence of the site (Appendix B2);
- A notice was displayed at the offices of the Khomas Regional Council (Appendix B3);
- A public notice announcing the proposed development and request for registration as an I&AP was placed in the Namibian and New Era newspapers on 29 July 2015 and 5 August 2015 (Appendix B4);
- Notification letters (Appendix B5) were distributed via registered post (Appendix B6) to surrounding property owners on 30 July 2015;
- Notification letters (Appendix B7) were hand delivered to the applicable Authorities (Appendix B8) on 31 July 2015; and
- Notification letters were distributed via email on 3 August 2015 (Appendix B9) to all I&APs (Appendix B1).

(ii) Comments Received and Responses Provided

All comments and feedback received from I&APs and Authorities are summarised in Table 6.1 below and attached as Appendix G. The list of registered I&APs and authorities are indicated in Appendix B10.

Table 6.1 – Comments received and feedback given on initial PPP.

NO	DETAILS	COMMENTS	DETAILS	RESPONSE
1	**Date:** 31 July 2015 **Names:** Coleen Mannheimer **Organisation:** Botanist	Good day, Please register me as an I/AP for the Kuiseb Estate EIA. Many thanks, Coleen Mannheimer	**Date:** 31 July 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear Coleen, Thank you. You have been registered and will be kept updated. Regards Brand
2	**Date:** 3 Aug 2015 **Names:** Charles Tubalike **Organisation:** MRLGH	Dear Mr Van Zyl, This area falls under the Khomas Regional Council and the Ministry works through the Khomas Regional Council (in terms of the decentralisation Act) to assess your development proposal in Khomas Region laying outside the Municipal borders of Windhoek. Please obtain Khomas Regional Council comments in this regard. Charles	**Date:** 3 Aug 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear Mr. Tubalike, We have contacted the Regional Council and obtained their info. Regards Brand van Zyl

3	**Date:** 7 Aug 2015 **Names:** EAM de Paauw & Conrad M Lutombi **Organisation:** Roads Authority	Sir, Your letter of 30 July 2015 has reference: With regard to the proposed development kindly note the following: 1) District Road 1418 has a 60m wide road reserve, measured 30m to each side of the centreline. 2) Application will need to be made to the Roads Authority for authorization for an access from the development onto the District Road. 3) The approved access road would need to be constructed to the standards and specifications of the Roads Authority and to no costs to the Authority. Yours sincerely Conrad M Lutombi	**Date:** 7 Aug 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear Mr. Lutombi, Noted, thank you. Regards Brand van Zyl
4	**Date:** 14 Aug 2015 **Names:** NP Du Plessis & Jolanda Murangi **Organisation:** NamWater	Dear Brand Please register NamWater as an I&AP. Please investigate the following concerns properly: 1. Risk of pollution to Friedenau Dam. 2. Risk of groundwater pollution. 3. Water demand and supply including capacities of infrastructure. 4. Waste management. 5. Increased traffic on the gravel road.	**Date:** 18 Aug 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear NP, Thank you, Namwater has been registered and will be kept informed. Regards Brand van Zyl

		Regards NP		
5	**Date: 17 Aug 2015** **Names:** Sonja Loots **Organisation:** National Botanical Research Institute	Good Day, I would like to be registered as an Interested and Affected Party on behalf of the National Botanical Research Institute. Please forward to me any background documents that you may already have available. Regards Sonja Loots	**Date:** 18 Aug 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear Sonja, Apologies, find attached a letter containing information on the proposed development that was send to I&APs. Should you have any further questions/comments please let me know? Regards Brand van Zyl
	Date: 18 Aug 2015 **Names:** Sonja Loots **Organisation:** National Botanical Research Institute	Dear Brand, Thank you for the documents. I have just two comments. The first one regards the building of the access roads. I see that the road will be paved or tarred and this is good, but I suppose you will need to get gravel from somewhere near to build the road. I have recently witnessed the destruction of an entire population of *Lithops* due to thoughtless quarrying of gravel for construction access roads to such an estate as the one that you are planning. It seems that the EIA covers the actual road that will	**Date:** 18 Aug 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear Sonja, Thank you for your comments, I will include it into the assessment and propose the necessary mitigations. Can you please provide me with a list of indigenous species that we can recommend for inclusion into the Home Owners Association's Agreement? Regards Brand van Zyl

		be built, but not the sourcing of gravel, which can have a devastating impact on vegetation. The second comment is about your statement that gardening will be restricted to indigenous plants. I think you will have to make sure that your occupants really know which plants are indigenous, or they will plant Cacti, Agave and other non-indigenous succulents that can become invasive. I am concerned about this because it is already happening at other country estates. Best wishes, Regards Sonja Loots		
	Date: 25 Aug 2015 **Names:** Sonja Loots **Organisation:** National Botanical Research Institute	Dear Brand van Zyl, I include a list of trees and shrubs that are generally suited for the Windhoek area to serve as a guide for you. It is always best to plant the species that thrive naturally in any given area, so you may want to look around the estate site to see what species occur frequently. If the area is frost sensitive, then one should obviously take care to plant species that are frost-hardy (see the list). I hope this information helps but you can also get gardening advice from Silke Rugheimer, she is the head of the Botanical Gardens here.	**Date:** 25 Aug 2015 **Names:** B van Zyl **Organisation:** Urban Green	Dear Sonja, Thank you. Regards Brand van Zyl

		silker@nbri.org.na and she knows a lot about indigenous gardening. Best wishes, Regards Sonja Loots		

6.2.2 SECOND ROUND OF CONSULTATION

During the second round of consultation, I&APs and Authorities were given an opportunity to comment on the Draft Scoping Report from 23 October 2015 to 30 October 2015.

(i) Activities of Public Engagement

Tasks undertaken to inform all I&APs of the availability of the Draft Scoping Report for review are as follows:

- All pre-identified I&AP (Appendix B1) and registered I&APs (Appendix B10) were informed via email (Appendix B11) of the availability of the Draft Scoping Report for review;
- Proof of successful delivery of the invitation email is attached as Appendix B12.

(ii) Comments Received and Responses Provided

No comments were received from any of the I&APs. All correspondence is attached as Appendix G.

CHAPTER 7 DESCRIPTION OF THE PROPOSED DEVELOPMENT[1]

This chapter provides a description of the physical appearance of the proposed development, possible resources use and waste generated, required engineering services, the expected socio-economic contribution, and the nature of the construction activities.

7.1 THE PROPOSED DEVELOPMENT

Considering the low farming potential of the eastern portion (Portion A), the mix-used nature of the larger surrounding area and scenic beauty, it is the desire of the owner of the Remainder of Farm Landmister No. 331 to develop the eastern portion (Portion A) for purpose of a low-key country estate.

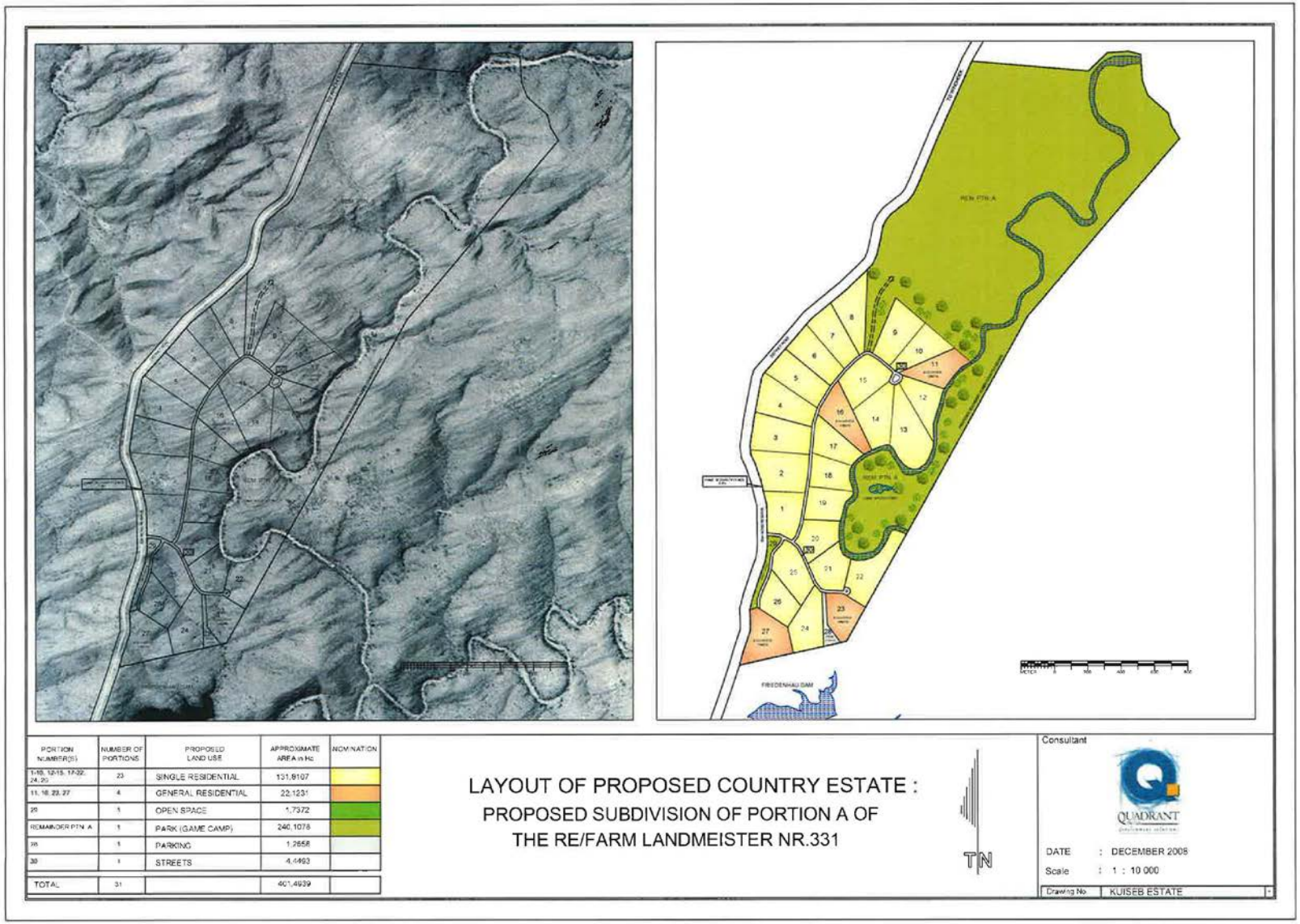
The target niche market would be the 'environmentally sensitive investor' who prefers to live in nature and have as small as possible footprint by way of their living style. Considering the environmentally sustainable design and technology to be applied (i.e. solar, wastewater recycling, environmentally sensitive design and material use) the Kuiseb Country Estate is targeted at the high-income segment of the local market. The Kuiseb Country Estate will be managed by a Property Owner's Association, which would be elected from the property owners.

The concept is to have a low-density residential development that would be an environmentally sensitive and self-sustaining development, in touch with the limitations and potential of the surrounding natural environment. The entire Kuiseb Country Estate will be game fenced.

For this purpose the owner intends to subdivide the Remainder of the Farm Landmister No 331 into a portion (Portion A), which will be further subdivided and developed for low-density residential purpose. Portion A will be ±400ha in size, comprising of a 'residential' component and a 'conservation' component (see Figure 7.1), which is almost 50/50 in surface. The layout of the 'residential' component with internal roads to the southern side of Portion A and the 'conservation' component to the northern side was done considering the already disturbed area to the southern part of Portion A. Ecologically sensitive areas (i.e. outcrops, vegetation clusters, and protected tree species) within each of the 27 portions will be demarcated and excluded from the developable portion of each Portion.

The locality of each house will be carefully planned taking into consideration the environmental sensitivity and privacy of other owners. The area to be fenced-in will be limited to ensure that the majority of the surrounding natural environment is left intact. Gardening will be limited and restricted to indigenous plants.

[1] Information supplied by the Project Town Planner.



PORTION NUMBER(S)	NUMBER OF PORTIONS	PROPOSED LAND USE	APPROXIMATE AREA in Ha	NOMINATION
1-10, 12-15, 17-22, 24, 29	23	SINGLE RESIDENTIAL	131,9107	
11, 16, 23, 27	4	GENERAL RESIDENTIAL	22,1231	
28	1	OPEN SPACE	1,7372	
REMAINDER PTN A	1	PARK (GAME CAMP)	240,1078	
26	1	PARKING	1,2658	
30	1	STREETS	4,4493	
TOTAL	31		401,4939	

Figure 7.1 – Proposed layout of the Kuiseb Country Estate

Residents will have access to this 'conservation' area, which would be limited to walking or cycling. No motorised vehicle would be allowed within this area.

As indicated in Table 7.1 above, the residential component, situated to the southern part of Portion A, will comprise of 27 residential plots with a median size of 5ha each. Apart from the four portions earmarked for a slightly higher density (Portions 11, 16, 23 and 27), all other portions will accommodate only one dwelling per portion. The general residential erven with a slightly higher density will accommodate a maximum of four sectional title cluster units each. A total of 43 dwellings are planned for the Kuiseb Country Estate.

Table 7.1 – Proposed subdivision of Portion A

PORTION NO	NO OF PORTIONS	PROPOSED LAND USE	AREA (HA)
Portions 1-10; 12-15; 17-22; and 24-26	23	Single Residential	131,8107
Portions 11, 16, 23 and 27	4	General Residential	22,1231
28	1	Parking	1,2658
29	1	Open Space	1,7372
30	1	Internal Road network	4,4493
Re of Portion A	1	Park (Conservation game camp)	240,1078
Total	**30 and Rem**		**401,4939**

The intended architecture (i.e. design, colour, size, height, etc.) will be in touch with the environmental characteristics and surrounding landscape, which will be designed by a professional and environmentally sensitive architect.

Strict environmental and development controls will be put in place as part of future sale agreements to ensure that the development within the Country Estate adheres to and supports the existing environmental and leisure initiatives at the Friedenau Dam.

An important aspect of the proposed Kuiseb Country Estate was to secure vehicular and pedestrian access to the Friedenau Dam. Portion 28 of the Kuiseb Country Estate has been specifically created to allow for a vehicular parking area for residents who wishes to visit the Dam Area. A specific agreement will be put in place through negotiations with NamWater and Mr G. Louw (who manages the current leisure activities at the dam on behalf of NamWater).

7.2 SERVICE INFRASTRUCTURE

Provision of services for developments taking place outside of the City of Windhoek's Urban Area is the responsibility of each developer. Basic municipal services (i.e. electricity, water, wastewater treatment, domestic waste removal) will be constructed by the Proponent and managed by the Property Owners Association, which will act as the local authority to the Kuiseb Country Estate.

Apart from the water reservoir, all services will be located within the proposed internal road reserve and buried underground to have no visual or aesthetic impact.

Windhoek Consulting Engineers has been appointed and will be responsible for the service designs and construction management of services.

7.2.1 ELECTRICITY SUPPLY

Given the concept of the Kuiseb Nature Estate, the larger quantity of electricity will be sourced via solar, while grid electricity (Nampower) will act as support and back-up.

Each dwelling will thus be fitted with a solar system capable of supplying a single household, while grid electricity from NamPower will only serve in times of low supply from the solar system (i.e. rainy season, maintenance or breakages to solar system). As discussed and agreed between the project Town Planner (Quadrant Development Solutions) and Nampower, the existing 22kVA electricity line would be sufficient and capable of supplying the proposed Kuiseb Country Estate with electricity. On obtaining of the Environmental Clearance Certificate, a formal application with engineering design will be submitted with NAMPOWER for approval and implementation.

No street lighting is intended, mainly to retain the rural character and not to have an impact on insects, or have an increased load on the existing electricity network.

It is further recommended that other 'green' technologies be explored to reduce the proposed development's dependence on power resources. Architectural designs and building materials should be as such to reduce dependency on artificial heating and cooling in order to limit the overall energy requirements.

7.2.2 POTABLE WATER SUPPLY

The estimated water demand per month is 1,500m³, when fully operational. As discussed between the Project Town Planner (Quadrant Namibia (PTY) Ltd) and Namwater, the bulk of potable water will be sourced from the existing Namwater supply line situated to the western boundary of proposed Portion A, along the DR1418, which is expected to have enough capacity to supply in the demand of the Kuiseb Country Estate.

As discussed between the project Town Planner (Quadrant Development Solutions) and Namwater (Mr K. Theron), it is the intention of Namwater to construct a water purification plant from where treated potable water will be pumped via the exiting pump line to the various developments along the DR1418. On obtaining of the Environmental Clearance Certificate, a formal application with engineering design will be submitted with Namwater for approval and implementation.

Potable water will be stored in an on-site reservoir from where each plot will be serviced via an underground pipe network, to be situated with the inter road reserve to minimise disturbance to the natural habitat. The reservoir will be covered with soil and the sloped vegetated with local indigenous vegetation to avoid any visual impact.

Each dwelling unit will also be fitted with a rainwater harvesting system, capable of storing 40m³ of rainwater for use, which should contribute substantially to reduce the pressure on the natural resource.

It is further recommended that water saving mechanisms be incorporated within the proposed development's design in order to reduce water demands. Gardens should be limited in size, especially lawns. It is also important that the planting of locally available and indigenous plants be promoted, which are much more resilient to the local climate conditions.

7.2.3 WASTE SERVICES

(i) Domestic Waste

The main source of dry waste will be domestic waste generated within the various households. A local waste management system will be implemented and managed by the Property Owners Association. The mentioned system will be similar to that of the waste management system within towns, where waste is collected from the households on a weekly basis and transported to the facilities of Rent-a-drum in Windhoek.

No temporary storage of waste is intended and should not be allowed.

(ii) Sewage

Sewage to be generated at the proposed development is of a domestic nature (i.e. kitchen waters, showers and baths, toilets, washing machines, basins). It is estimated that each household will generate between 800l/day to 1,000l/day.

For purpose of wastewater treatment, an on-site biological wastewater treatment plant will be installed at each household, capable of treating up to 1,700l/day to the required general standards. All treated wastewater will be reused for gardening purpose at each household. As per the requirements from the Directorate Water Affairs (Ministry of Agriculture, Water and Forestry), the necessary permits will be obtained for purpose of wastewater treatment and reuse.

The particular system to be installed is the Clarus Fusion® Wastewater Treatment Plant. The particular system combines the elements of anaerobic and aerobic digestion, and by design follows exactly the same treatment steps as an activated sludge municipal plant with the difference that it is much smaller and designed to use minimal electricity and have minimal running costs. The system readily and consistently meets the secondary treatment standards of 9 mg/L CBOD5 and 9 mg/L TSS. Because the Fusion® is equipped with built-in pre-treatment, no additional septic tank is required.

The use of media within the Fusion® yields extremely reliable treatment. Although wastewater constituents and flow rate can vary from day to day, the Fusion® will continue to perform consistently, effectively and efficiently. The system can even sustain low or no flow periods for several months with little or no disruption of effluent quality.

After treatment the final effluent will have a quality equal to that what is specified for the Special Standards as envisaged as mandatory in the near future (tabled but not enforceable yet) by the Department of Water Affairs and Forestry (DWAF).

Below (Figure 7.2) is a schematic illustration of the entire wastewater treatment system that will be installed at each household. The entire system is installed underground (see Photo 7.1) and requires only 15m² land. More detail on the Fusion® WWTP can be found in Appendix D.

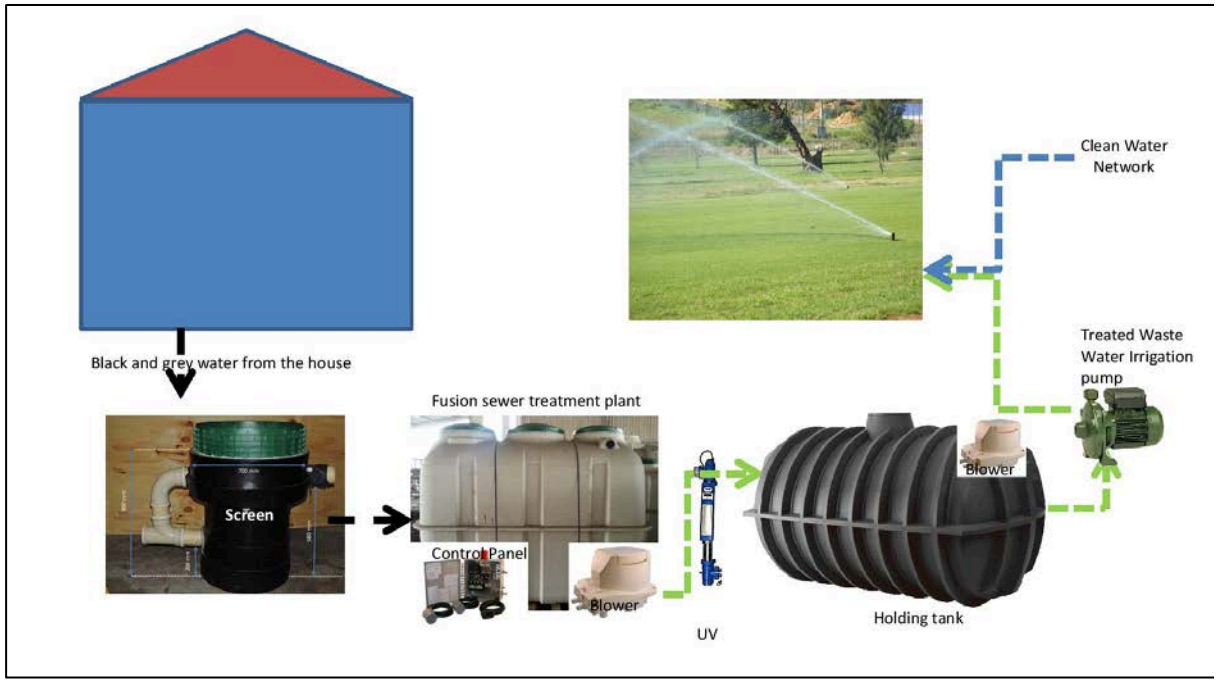


Figure 7.2 – Schematic illustration of WWTP Layout

Photo 7.1 - Final grade after installation

7.2.4 INTERNAL ROADS & STORM WATER INFRASTRUCTURE

The internal road network will be design as such that each dwelling will be given access to the DR1418, as indicated in Figure 7.1.

The alignment of the road will be determined by the topography and water courses, as well as the locality of trees and shrubs to be protected as part of the development. Road construction (i.e. cutting and filling) will be restricted to the minimum and no quarrying is intended as the internal roads will not be of public roads standards, but to standards sufficient for the low vehicle volumes.

The width of the internal road (10m) is kept to the absolute minimum to limit the impact on the natural habitat and operational maintenance. The road surfaces will be a combination of paved, tarred or gravel roads, while storm water designs will be applied to prevent any erosion from surface water runoff.

7.2.5 ACCESS

The property's location is considered very favourable in terms of access, since it is situated adjacent to the existing DR1418 road situated along the western boundary of Portion A, which is again linked with the C28 road leading to Windhoek and Walvis Bay.

From the feedback received from the Roads Authority (see Appendix G), the design of the access should be done as per the required standards from the side of the Roads Authority.

7.2.6 FIRE SAFETY SERVICES

Considering the risk of veld fires, which is common in the area during the rainy season, the necessary infrastructure (i.e. fire hydrants) will be installed at each of the dwellings. The Property

Owner's Association, which will act as the local authority, will also provide for additional firefighting equipment (i.e. fire truck).

7.3 SOCIO-ECONOMIC CONTRIBUTION

The proposed Kuiseb Country Estate is expected to have a direct and indirect positive socio-economic impact to both the Proponent and the surrounding communities.

For the owner and Proponent, the direct socio-economic benefit lies in the sale of the 400ha of land (i.e. income generation), which to date has been uneconomical from a commercial farming perspective and has as a result been lying vacant.

From a local perspective within the particular part of the Khomas Region, the proposed development will bring short-term (construction phase) and long-term (operational phase) employment to the local residents, which are currently experiencing a very high unemployment rate. The Kuiseb Country Estate is expected to create between 150 to 200 new employment opportunities during the construction phase and 40 to 70 during the operational phase. Skills transfer during the construction phase is a very important aspect to economic independence of the individual and contributes to stimulation of entrepreneurs and independent economic businesses. These direct employment opportunities will in-turn enhance the socio-economic status of the employees' and there dependants. It is also envisaged to source the main labour requirements from the local area and not from Windhoek.

Although small, the Kuiseb Country Estate is expected to contribute to nationally job creation and economic growth, which is set as a priority from the side of National Government.

The proposed development will further strengthen the current economic spine stretching from Farm Baumgartsbrunn No. 15, situated along the C28, to the Friedenau Dam, to become a more prominent role player contributing too much-needed socio-economic upliftment of the Region.

It is believed that the Kuiseb Country Estate will provide in the demands of those people interested in an alternative lifestyle living close to nature in a much more sustainable manner as what is currently presented within Namibia's urban areas.

7.4 CONSTRUCTION ACTIVITIES

Activities associated with the construction phase, but not necessarily limited to, are:

- Setting-up of a –
    - construction yard and storage area;

- site office and parking area;
- batching area;
- temporary ablution facilities;
- solid waste disposal facility;
- stockpile area; and
- area for the handling of hazardous substances, wash bays, bulk storage and dispensing of fuel.

- Clearance of vegetation and stockpiling.
- Removal of topsoil and storage at topsoil storage area.
- Access to and from the site by construction vehicles.
- Daily commuting of labour force and daily accommodation on site.
- Digging of trenches and construction of infrastructure.
- Usage of water for daily construction activities and generation of different kinds of waste (i.e. construction material; domestic waste; wastewater).

A variety of impacts are expected given the nature of the construction phase. The impacts expected to occur during the construction phase are to a certain extent similar to that of the operational phase, although some impacts are exclusive to the construction phase and is short-lived.

The impacts expected to occur during the construction phase, the assessment therefore and the mitigations recommended (see Section 8.2.1) are also listed in much detail within the attached Construction Environmental Management Plan (Appendix F).

CHAPTER 8 ASSESSMENT OF ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS, AND MITIGATION FORMULATION

This chapter provides a description and assessment of the key potential impacts that might be a result of the proposed development of the Kuiseb Country Estate at proposed Portion A of the Farm Landmister No. 331, as presented in Chapter 6 of this Report.

Mitigation measures relevant to the planning, design, construction and operational phases of the proposed development as appropriate are recommended for implementation. These measures (i.e. mitigations) are aimed at avoiding or minimising negative impacts or enhancing potential benefits. The significance of potential impacts without and with mitigation is also provided.

8.1 METHOD OF ASSESSMENT

The potential impacts of the proposed development are evaluated in terms of duration (time scale), extent (spatial scale), intensity (magnitude), probability and status, which in combination provide the expected significance (Table 8.1).

The magnitude of an impact is a judgment value that rests with the individual assessor and project specialists, while the determination of significance rests on a combination of the criteria for duration, extent and magnitude. Significance is also a judgment value made by the assessor and specialists.

Table 8.1 – Impact Assessment Criteria

CRITERIA	CATEGORY
Impact	This is a description of the expected impact.
Nature Describe the type of effect.	*Positive:* The activity will have a social/ economical/ environmental benefit. *Neutral:* The activity will have no effect. *Negative:* The activity will be socially/ economically/ environmentally harmful.
Extent Describe the scale of the impact.	*Site Specific:* Expanding only as far as the activity itself *(onsite)* *Small:* Restricted to the site's immediate environment within 1 km of the site *(limited)* *Medium:* Within 5 km of the site *(local)* *Large:* Beyond 5 km of the site *(regional)*

CRITERIA	CATEGORY
Duration Predicts the lifetime of the impact.	*Temporary:* < 1 year *Short-term:* 1 – 5 years *Medium term:* 5 – 15 years *Long-term:* >15 years (Impact will stop after the operational or running life of the activity, either due to natural course or by human interference) *Permanent:* Impact will be where mitigation or moderation by natural course or by human interference will not occur in a particular means or in a particular time period that the impact can be considered temporary.
Intensity Describe the magnitude (scale/size) of the Impact.	*Very low:* Affects the environment in such a way that natural and/or social functions/processes are not affected. *Low:* Natural and/or social functions/processes are slightly altered. *Medium:* Natural and/or social functions/processes are notably altered in a modified way. *High:* Natural and/or social functions/processes are severely altered and may temporarily or permanently cease.
Probability of Occurrence Describe the probability of the Impact actually occurring.	*Improbable:* Not at all likely. *Probable:* Distinctive possibility. *Highly probable:* Most likely to happen. *Definite:* Impact will occur regardless of any prevention measures.
Degree of Confidence in Predictions State the degree of confidence in predictions based on availability of information and specialist knowledge	*Unsure/Low:* Little confidence regarding information available (<40%). *Probable/Med:* Moderate confidence regarding information available (40-80%). *Definite/High:* Great confidence regarding information available (>80%).
Significance The impact on each component is determined by a combination of the above criteria.	*No change:* A potential concern which was found to have no impact when evaluated. *Very low:* Impacts will be site specific and temporary with no mitigation necessary. *Low:* The impacts will have a minor influence on the proposed development and/or environment. These impacts require some thought to adjustment of the project design where achievable, or alternative mitigation measures.

CRITERIA	CATEGORY
	Moderate: Impacts will be experienced in the local and surrounding areas for the life span of the development and may result in long term changes. The impact can be lessened or improved by an amendment in the project design or implementation of effective mitigation measures. *High:* Impacts have a high magnitude and will be experienced regionally for at least the life span of the development, or will be irreversible. The impacts could have the no-go proposition on portions of the development in spite of any mitigation measures that could be implemented.

8.2 POTENTIAL IMPACTS IDENTIFIED AND ASSESSMENT

The information presented in this section has mainly been drawn from the Proponent's information regarding the proposed development, specialist studies compiled and public engagement that was undertaken as part of this phase of the EIA process. The status of all potential impacts described and assessed below should be considered to be negative unless indicated otherwise.

Given the nature of the proposed development, measured against the sensitivity of the receiving natural and social environments, as assessed by the specialists, certain issues of concern and potential impacts (positive and negative) were identified. Some impacts are considered to be of greater potential significance and others less so.

For this assessment's purpose, the issues and impacts identified are grouped into those associated with the Construction Phase and the Operational Phase. The sections below give a broad overview of each impact expected and the mitigation measures proposed.

8.2.1 CONSTRUCTION-RELATED IMPACTS

Construction impacts are viewed as being temporary in nature, but have the potential to result in permanent damage if not dealt with timeously and effectively. The following section provides details of the potential impacts that might occur during the construction of infrastructure (i.e. roads, water, electricity, wastewater) and houses. Together with each identified impact is a table detailing the assessment of the impact and thereafter follows a recommended mitigation measures that are to be considered in relation to the impacts.

Detailed mitigatory measures and environmental requirements having direct relevance to the expected construction impacts are presented in the attached Construction Environmental Management Plan (Appendix F).

(i) Ground and Surface Water Pollution

The soil, geological and geohydrological characteristics of Portion A (the Site) suggests that the area in general has poor groundwater potential and the predominant geology in the area results in very little risk of groundwater contamination, *unless* pollutants end up in geological structures acting as preferential groundwater flow paths (faults or open joints) or along the river courses (Kuiseb River to the eastern part of the site) where groundwater flow in the alluvial sediments will be higher (see section 5.7.1) No major geological structures, enhancing groundwater recharge or flow, are evident on the proposed site *unless* pollutants end up along the river courses (Kuiseb River to the east of the site) where groundwater flow in the alluvial sediments will be higher (see section 5.7.3).

Construction activities are associated with a variety of potential pollution sources (i.e. cement, oils, diesel, chemicals, etc.), either having a direct and immediate impact or indirect and longer-term impact. As a single incident, in order for the downstream ground water to be contaminated, very large quantities of pollutants will have to be realised into the environment, of which volumes are not associated with this type of development (i.e. low-key residential). Although, however small these potential sources of pollution it still requires special attention (i.e. planning, control and management) to avoid any potential pollution of the immediate environment and contributing to the cumulative pollution impacts.

Table 8.2 – Surface and ground water pollution significance

Impact Description	Groundwater and Surface Water
Nature	Negative – will be harmful to the downstream water sources (i.e. boreholes & Friedenau Dam)
Extent	Small
Duration	Long Term
Intensity	Very low
Probability	Probable
Degree of Confidence	Probable / medium
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very low**

With the proper precautionary measures in place, it is unlikely that surface and/or groundwater contamination will occur and therefore the proposed construction phase is not likely to have any significant impacts on surface waters and downstream groundwater recourses.

Given the environment's natural characteristic and potential sources of construction pollution, surface and groundwater impacts are expected to be ***low*** before mitigations and ***very low*** following proper mitigation measures and continues monitoring (see Table 8.2).

Various Method Statements (e.g. bunding; camp establishment and fencing; concrete batching; bulk earthworks; demolition; fuels and fuel spills; solid waste management; wash areas; storm water management) are compulsory (see Appendix F) as part of the construction phase, which should be closely monitored by the Environmental Control Officer (ECO).

Consideration should be given to controlling potentially harmful impacts while 'best' practice measures should be applied to minimise the potential for discharges of pollutants to nearby receiving drainage channels. Direct involvement from the side of the geohydrologist is a prerequisite in determining the locality of the construction site, associated buildings and services.

Wastewater from temporary site facilities should be controlled to prevent direct discharge to neighbouring drainage channels. Such wastewater may include sewage effluent from toilets and discharges from wash bays or service areas, to name a few. Proper containment mechanisms should be installed to contain any pollutants that might take place. Suitable flood protection must be in place to prevent a release during flooding. See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

(ii) Erosion and Sedimentation

The eastern portion of the Farm (Portion A), upon which the proposed Kuiseb Country Estate is intended, comprises of undulating terrain with very steep slopes found within the eastern section overlooking the Kuiseb River. Smaller watercourses drain the Portion towards the Kuiseb River, which again drains into the Friedenau Dam to the south. Soils are shallow and covered with a layer of pebble mulch, which if disturbed (i.e. vegetation removal or excavations) is susceptible to erosion during the rainy season (see section 5.7.1).

Given the fact that vegetation clearance and disturbance to the pebble mulch will take place in areas where infrastructure and dwelling will be constructed, erosion and sedimentation can be expected, which in turn could result in seasonal (rain season) degradation of habitats. Areas having a steep gradient would be more susceptible to erosion and sedimentation. The amount of erosion and sediment transport is thus directly related to the gradient of the receiving area and time of the year that construction occurs. If clearing and grading activities take place during the wetter months of the year (November to March), substantially more erosion and sedimentation can be expected.

Table 8.3 – Erosion and sedimentation significance

Impact Description	Erosion and sedimentation
Nature	Negative
Extent	Medium (low gradient) / High (steep gradient)
Duration	Long Term
Intensity	Low (low gradient) / High (steep gradient)
Probability	Probable
Degree of Confidence	Probable / medium
Significance Pre-mitigation	Low (low gradient) / medium (steep gradient)
Significance Post-mitigation	**Very low (low gradient) / low (steep gradient)**

With the proper precautionary measures in place, it is unlikely that erosion and sedimentation will occur and therefore the proposed construction phase is not likely to have any significant impact.

Given the environment's natural characteristic and potential occurrence of erosion and resulting sedimentation, impact significance is rated as ***low*** before mitigations and ***very low*** following proper mitigation measures for the moderate gradients, and a ***medium*** before mitigations and ***low*** significance following proper mitigation measures (see Table 8.3). See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

(iii) Habitat Destruction and Loss of Biodiversity

The larger Site is still within a natural and generally undisturbed state although not regarded as in a pristine condition as it bears evidence of past agricultural activities (see Section 5.6). The drainage channels and Kuiseb River, which dissects the Site to the eastern part, are however regarded and classified as pristine and highly sensitive. From an ecological perspective the area is by no means ecologically unique or protected although it is expected to potentially accommodate some protected species under the Forestry Ordinance No. 37 of 1952 and Nature Conservation Ordinance No. 4 of 1975 (see Section 5.7.4). The most important larger trees/shrubs are viewed as the various protected species and species of conservation concern and include *Aloe litoralis*, *Commiphora dinteri*, *Cyphostemma bainesii*, *C. currorii* and *Heteromorpha papillosa*. None of the important faunal species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected by the Kuiseb Country Estate development.

Removal of vegetation cover is inevitable to make way for the construction site, various infrastructure and buildings, which along with secondary impacts (i.e. noise, dust and erosion) may displace faunal species. Some of the smaller species living underground (burrow species) might not escape the construction activities in time and be killed. The sensitive ecological features such as the two rocky outcrops found onsite should be demarcated and excluded from the development footprint.

Table 8.4 – Habitat destruction and loss of biodiversity significance

Impact Description	Habitat destruction and loss of biodiversity
Nature	Negative
Extent	Site specific
Duration	Long Term (dwellings & roads) / temporary (services)
Intensity	Low
Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very low**

Given the environment's natural characteristic and scale of habitat disturbance, the impacts are expected to be ***low*** before mitigations and ***very low*** following proper mitigation measures and continues monitoring (see Table 8.4).

Removal of vegetation cover is inevitable to make way for buildings, infrastructure and paved surfaces, but should however be done within a properly planned and responsible manner to avoid unnecessary removal of ground cover or any protected species – Environmental Conservation Act (Act No. 73 of 1989). For this purpose it is required that a Method Statement be drafted. Unnecessary destruction of habitats within the footprint of the Site should be avoided and if not possible measures should be taken to scare the species from their habitat. This should form part of the pre-construction Site survey and done within a properly planned and responsible manner. Rehabilitation of disturbed areas is very important and should be done in accordance with the requirements as stated in the Construction Environmental Management Plan (Appendix F) and Table 8.14.

(iv) Construction Noise & Vibration

The area surrounding the Site is still of a predominant of a rural nature, although spots of urban like activities (i.e. settlements, nursery, recreational, etc.) are found within the larger and immediate area (see section 5.2 & 5.6). Noises that could be heard on the Site were that of an occasional vehicle along the DR1418. The nearest potential receivers from the most southern part of the proposed Kuiseb Country Estate are the tourist activities at the Friedenau Dam situated ±1 km away.

Noises and vibrations are expected as a result of heavy machinery (e.g. front-end loaders, backhoes, dump trucks, etc.) during the construction period, as well as delivery trucks entering and leaving the Site. It is assumed that construction activities, in general, will be carried out on an 8-hour day (i.e. 08:00 – 17:00) all days of the week except Sundays. No night-time construction is intended and should be prohibited.

Table 8.5 – Construction noise and vibrations significance

Impact Description	Construction noise and vibrations
Nature	Neutral
Extent	Site specific
Duration	Temporary
Intensity	Very low
Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very low**

Given the scale of the proposed development, level of noises associated with the construction activities, the temporary nature of the construction phase and distances between the source and receiver, the potential impact is regarded as ***low*** in significance before mitigations and ***very low*** following proper mitigation measures and continues monitoring (see Table 8.5). See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

(v) Dust & Emission

The air quality of the area is considered to be of a very good quality given the rural setting and very few sources of pollution. The air quality does however deteriorate during November to January as a result of feld fires. Occasional traffic along the DR1418 is a contributor to some quantities of dust and emissions, although minute. The area is not known to be subject to sever sand and/or dust storms, mainly as a result of low wind speeds (see Section 5.7.1).

Dust and emissions are associated with construction activities of which the severity is directly related to the extent of the proposed development and the nature of the receiving environment. Fugitive dust from cleared areas and raw materials stored on site has a higher potential to cause nuisance either to bypassing road users (DR1418) or construction personnel.

Given the prevailing winds throughout the year (easterly winds – 22%; north-easterly winds – 10% and westerly – 12%), distance to the nearest receiver (DR1418 to the west and the Friedenau Dam to the south) and temporary nature of the construction activities, dust impacts are expected to be more of a concern for travellers on the DR1418, if any, than any other receiver.

Table 8.6 – Dust and emissions significance

Impact Description	Dust and emissions
Nature	Neutral
Extent	Site specific
Duration	Temporary
Intensity	Very low
Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very low**

Dust control is regarded as an important aspect in ensuring safety and health on-site and surrounding areas. Dust holds a ***low*** significance before mitigation and ***very low*** after mitigation (see Table 8.6). See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

(vi) Visual Aesthetics and Sense of Place

The Site is located on an undulating terrain, which slopes to the east, where some areas will be more visible than others, especially from the DR1418 road that forms the western boundary of the site. The Site and surroundings are still characterised by areas of largely undeveloped farmland of very low development density, with only a few recreational or low-key residential developments taking place within the development axis (see section 5.2 & 5.6). The nearest receivers to these construction sites are traffic along the DR1418 to the west and the Friedenau Dam to the south. The scenic beauty of the landscape and attraction of the Friedenau Dam to the south (i.e. sense of place) are all positive features to be retained.

Construction sites are known to have a visual impact considering their purpose. Given the size and number of construction sites and associated activities and the fact that it will be scattered around and temporary nature thereof, no significant change to the larger landscape character is expected, but to the immediate character though. The sense of place of the immediate area (i.e. area at the construction site) will change to that of a construction site as building and services rise-up from the Site. It would however not be possible to hide the infrastructure from the immediate surroundings given the raised locality of the Property towards the east but with proper design, it can be properly blended in within the landscape.

Table 8.7 – Visual aesthetics and sense of place significance

Impact Description	Visual aesthetics and sense of place
Nature	Negative
Extent	Small
Duration	Temporary
Intensity	Very low
Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very low**

Given the rural like nature associated with larger open areas of rolling hills and little disturbance, the landscape can be classified as sensitive to any intrusion. Considering the visual aesthetics of the natural surroundings, the nature of construction sites, the scale thereof and temporary existence, as well as the distance to the nearest receptor, the visual impact is expected to be ***moderate-low*** and can with appropriate mitigations be reduced to ***low*** (see Table 8.7). See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

Special caution needs to be applied from the side of the appointed contractor during the construction phase not to unnecessary cause disturbance by way of an untidy and badly managed construction site.

(vii) Health, Safety & Security

During the construction phase, it is expected that all construction staff will be sourced from the immediate communities within the area (i.e. Baumgartsbrunn). The number and duration of stay or work of the workforce will vary depending on the amount of construction planned and anticipated timeframe thereof. The construction phase is expected to generate 150 to 200 direct employment opportunities over the period of the construction phase.

Construction activities are unfortunately usually associated with increased criminal activities posing a security risk for the immediate residents. It is not to say that these criminal activities are as a result of the construction staff, but is known to happen in the vicinity of construction sites. Prostitution is also associated with construction activities especially where construction staff overnight at the site.

On-site safety of all personnel is an important responsibility from the side of the Contractor and should be adhered to as per the requirements of the Labour Act (Act No. 6 of 1992) and the Public Health Act (Act No. 36 of 1919).

Table 8.8 – Health, safety & security significance

Impact Description	Health, safety & security
Nature	Negative
Extent	Medium
Duration	Temporary
Intensity	Very low
Probability	Probable
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very low**

Given the proximity of the Site to the neighbouring communities and the fact that all construction personnel will be sourced from the immediate area, these potential impacts are regarded as having a ***low*** significance before mitigation and ***very low*** after mitigation (see Table 8.8). See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

(viii) Traffic Safety

Considering the fact that the majority of all building material will be sourced from Windhoek, delivery and construction vehicles are expected to use the C28 and DR1418 in order to reach the Site.

The C28 is of a higher order and carries much larger volumes traffic on a daily basis compared to the DR1418 (see section 5.3.3). Both roads are gravel roads and used primarily by farmers, farmworkers and visitors to the Friedenau Dam and surrounding low-key residential or tourist developments (see section 5.2). The DR1418 is a very wide gravel road with equal wide road reserve and is of a good condition. The proposed single access point from the DR1418 is situated at a straight section of the road with flat topography, which are all contributing factors to preferred road safety. The particular access has in principle been supported by the Roads Authority (see section 7.2.5).

Construction activities are associated with an increase in vehicles (i.e. workers' busses, delivery vehicles and construction vehicles) to and from the Site, which as a results increase the potential of accidents having a potential impact on other road users and vice-versa.

Table 8.9 – Traffic safety significance

Impact Description	Traffic safety
Nature	Negative
Extent	Large
Duration	Temporary
Intensity	High
Probability	Probable
Degree of Confidence	Definite
Significance Pre-mitigation	Moderate
Significance Post-mitigation	**Low**

The potential pre-mitigation impact is regarded as ***moderate,*** which can be reduced to ***low*** through applying proper mitigations (see Table 8.9). See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

General road users' safety is a very important aspect and requires special attention from the side of the appointed Contractor and sub-contractors. It is extremely important that all drivers be informed of their potential impact and that all necessary measures are taken to restrict any accidents as a result of increased traffic.

(ix) Natural Resources

The construction phase is associated with the use of natural resources as part of the physical construction of buildings and engineering services. These natural resources are either directly or indirectly used during the construction phase. Many of the materials (e.g. steel, metal sheets, cement) used in the construction of the buildings and engineering services are manufactured elsewhere and thus have an indirect impact on natural resources.

Natural resources from the area expected to be directly affected are soil, rocks, electricity and water. During the construction phase, diesel generators will be used to supply electricity, while water is expected to be sourced from the Namwater pipeline passing the site to the west along the DR1418 and brought in by water trucks. Building sand and bricks will be sourced from Windhoek.

Resource consumption (e.g. water and electricity) during the construction phase is temporary in nature and is usually associated with lower volumes compared to the long-term operational phase spanning over many years. Considering the impact to transport water to the Site and the fact that infrastructure need to be provided for the operational phase anyway, it is recommended that the proposed water infrastructure (i.e. reservoir) intended for the Operational Phase be constructed and used during the construction phase. The same principle applies to electricity.

The construction phase of the propose development is expected to have an impact on the natural resources, but is regarded as ***low***. Energy saving mechanisms and water wise methods should be applied during the construction phase to limit resource use. See Table 8.14 for more mitigations, as well as the Construction Environmental Management Plan (Appendix F).

(x) Heritage / Archaeological Resources

Given the historical background of Windhoek and surrounding areas, it can be expected that the area in close proximity to the Friedenau Dam might have had some historical role to play or value. No record of any cultural or historical importance or on-site resemblance of any nature could be located as part of this study.

The probability of locating any important archaeological heritage remains during the construction phase is likely to be ***improbable***.

Should any archaeological materials, such as human remains, burial sites and other artefacts be uncovered during earthworks, works in the area to be stopped immediately, and the find immediately reported to the Environmental Site Manager and the National Monuments Council. The latter will inspect the area within 24 hours of a find being reported (to prevent unnecessary delays in works) and make their recommendations. The archaeologist must inform National Heritage Council of any materials uncovered during world.

(xi) Socio-economic Contribution

The socio-economic character of the surrounding area is still mainly agricultural farmland with commercial cattle farming being the most prominent activity, although other types of activities (i.e. tourism; educational; commercial) are also found within the larger area (see section 5.4).

The proposed Kuiseb Country Estate is expected to have a direct and indirect positive socio-economic impact to both the Proponent and the surrounding communities (see section 7.3).

8.2.2 OPERATION-RELATED IMPACTS

These impacts are usually more permanent in nature and as a result have long-term impacts or at least until decommissioning of the proposed development (which is unlikely to take place). Different from the construction related impacts, no Operational Management Plan is provided. Recommendations are however made to specific Plans to be compiled by the Proponent/Property Owners' Association to provide for adequate planning, implementation and monitoring of certain activities and to incorporate specific impacts and related mitigations.

The following section provides details of the potential impacts that might occur during the daily operation of the Kuiseb Country Estate. Together with each identified impact is a table detailing

the assessment of the impact. Detailed mitigatory measures and environmental requirements having direct relevance to the expected operational impacts are presented in Table 8.15.

Given the nature of the Kuiseb Country Estate's operational phase and sensitivity of the immediate and surrounding environment, potential pollution of ground water resources requires special attention and strict monitoring. The visual impact within a rural-like landscape associated with very little urban like developments would also require some planning and proper implementation.

(i) Ground and Surface Water Pollution

The soil, geological and geohydrological characteristics of Portion A (the Site) suggests that the area in general has poor groundwater potential and the predominant geology in the area results in very little risk of groundwater contamination, *unless* pollutants end up in geological structures acting as preferential groundwater flow paths (faults or open joints) or along the river courses (Kuiseb River to the eastern part of the site) where groundwater flow in the alluvial sediments will be higher (see section 5.7.1) No major geological structures, enhancing groundwater recharge or flow, are evident on the proposed site *unless* pollutants end up along the river courses (Kuiseb River to the east of the site) where groundwater flow in the alluvial sediments will be higher (see section 5.7.3).

Potential sources associated with residential activities holding a pollution risk are usually as a result from wastewater leakages, improper domestic waste management and spills from resident's vehicles. Considering the low-key nature of the proposed Kuiseb Country Estate any potential impact would be small in significance. Having said that, the danger lies in continues pollution from a certain source over a long period. Pollution of water sources is prohibited by various legislations of which the Water Act (No. 54 of 1956) is the most restrictive. The close proximity of the Kuiseb River to the Site and the subsequent potential impacts necessitates the treatment of all types of effluent to the prescribed General Standard as per the Water Act (Act No. 54 of 1956, with Regional Standards as per Government Gazette No. R553 of 1962), as well as proper management of all kinds of waste generated.

Increased run-off created as a result of the proposed development (i.e. roofs and other hard surfaces) could enhance pollutant transportation, as well as increasing the distance pollutants can be transported away from its source. Storm water will follow the natural relief towards the downstream Kuiseb River. Storm water may contain contaminants, which would have the potential to cause negative impacts to ground water quality, most likely to downstream water users due to the drainage pattern.

Considering that, no centralised sewer system with manholes and long underground sewer pipes will be installed, but a localised wastewater treatment system, the risk of undetected leakage from sewer systems is substantially reduced. It is extremely important that the prescribed servicing of the proposed wastewater treatment system be done as per the manufacturer's recommendation, which would contribute to detecting leakages early. With regards to domestic waste, it is very

important that the temporary storage of waste at each household be done in such manner as not to result in any of the waste being exposed to the natural environment.

Table 8.10 – Surface and ground water pollution significance

Impact Description	Groundwater and surface water
Nature	Negative – will be harmful to the downstream water sources (i.e. boreholes & Friedenau Dam)
Extent	Large
Duration	Long Term
Intensity	High
Probability	Probable
Degree of Confidence	Probable / medium
Significance Pre-mitigation	Moderate-high
Significance Post-mitigation	**Low**

Given the environment's natural characteristic and potential sources of pollution, the operational phase is expected to have a ***moderate-high*** impact on the immediate environment before mitigation and ***low*** impact following proper mitigation measures (see Table 8.15) and continues monitoring. See Table 8.15 for more mitigations.

(ii) Visual Aesthetics and Sense of Place

The Site is located on an undulating terrain, which slopes to the east, where some areas will be more visible than others, especially from the DR1418 road that forms the western boundary of the site. The Site and surroundings are still characterised by areas of largely undeveloped farmland of very low development density, with only a few recreational or low-key residential developments taking place within the development axis (see section 5.2 & 5.6). The nearest receivers to these construction sites are traffic along the DR1418 to the west and the Friedenau Dam to the south. The scenic beauty of the landscape and attraction of the Friedenau Dam to the south (i.e. sense of place) are all positive features to be retained.

Visual intrusion common to a residential like development are characterised by infrastructure (i.e. reservoir, electricity lines, lampposts) and buildings. The extent of such intrusion is determined by a combination of the scale of the physical structure and the nature of the receiving landscape (i.e. developed or not; density, etc.). The proposed low density (1:5ha) is considered sensitive towards the landscape. Other sustainable proposal such as covering of the reservoir (and planting with local vegetation) and sustainable architecture (i.e. scale, colour, material, durability) will contribute to decreased visual pollution.

Special care should be taken with regards to the placement of the reservoir and dwellings so as to minimise potential visual impact and support the visual aesthetics of the larger landscape, which is considered central to attraction of the Kuiseb Country Estate.

Table 8.11 – Visual aesthetics and sense of place significance

Impact Description	Visual aesthetics and sense of place
Nature	Negative
Extent	Medium
Duration	Permanent
Intensity	Low
Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Moderate
Significance Post-mitigation	**Low**

Considering the nature of the proposed development and sustainable practises intended compared to the characteristics of the larger surrounding area, the visual impact expected would be ***moderate*** and can with appropriate mitigations be reduced to ***very low*** (see Table 8.11). See Table 8.15 for more mitigations.

(iii) Resource Demand vs Supply

The proposed development is directly dependant on resources such as potable water and to a certain extend electricity, of which both are currently considered as scares and nationally under pressure. It can be expected that the proposed development will result in an increase in the demand for both resources, thus having a cumulative impact.

The area is having a well-developed electricity and water infrastructure capable of providing the necessary services (see section 5.7.1 & 5.7.2), as per the discussions between the Project Town Planner (Quadrant Namibia (PTY) Ltd) and the respective service providers.

With regards to electricity, the larger quantity will be sourced via solar, while grid electricity (Nampower) will act as support and back-up. From the information received from the project Town Planner, sufficient capacity exist with the existing Nampower infrastructure to supply in the demand of the Kuiseb Country Estate (see section 7.2.2).

Potable water will be sourced from the existing Namwater underground pipeline, which according to the Project Town Planner has sufficient capacity to supply in the demand of the Kuiseb Country Estate (see section 7.2.3). In addition to the mentioned, each dwelling unit will also be fitted with a rainwater harvesting system, capable of storing 40m³ of rainwater.

Table 8.12 – Resource demand vs supply significance

Impact Description	Resource demand vs supply
Nature	Neutral
Extent	Large
Duration	Permanent
Intensity	Low
Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very Low**

Considering the low-key nature of the proposed Kuiseb Country Estate (i.e. 47 dwellings) and sustainable practises to be implemented the impact on electricity and water resources are considered as very low after mitigation (see Table 8.12). See Table 8.15 for more mitigations.

(iv) Traffic Safety (access to and from development)

Operational activities in this respect are associated with residents' and visitors' vehicles to and from the Kuiseb Country Estate, which will make use of the C28 and the DR1418.

The C28 is of a higher order and carries much larger volumes traffic on a daily basis compared to the DR1418 (see section 5.3.3). Both roads are gravel roads and used primarily by farmers, farmworkers and visitors to the Friedenau Dam and surrounding low-key residential or tourist developments (see section 5.2). The DR1418 is a very wide gravel road with equal wide road reserve and is of a good condition. The proposed single access point from the DR1418 is situated at a straight section of the road with flat topography, which are all contributing factors to preferred road safety. The particular access has in principle been supported by the Roads Authority (see section 7.2.5).

At full operation, the proposed development will result in an increase in road users along the C28 and DR1418, estimated at a daily average of 32 vehicles.

Table 8.13 – Traffic safety significance

Impact Description	Traffic safety
Nature	Neutral
Extent	Large
Duration	Permanent
Intensity	Very low

Probability	Definite
Degree of Confidence	Definite
Significance Pre-mitigation	Low
Significance Post-mitigation	**Very Low**

The potential pre-mitigation impact is regarded as ***low,*** which can be reduced to ***very low*** through applying proper mitigations (see Table 8.13). See Table 8.15 for more mitigations.

The greatest point of potential conflict is believed to be at the exit of the DR1418 into the Kuiseb Country Estate. It is thus necessary and important that the access and exit point be designed as per the requirements of the Roads Authority and that the necessary traffic calming signs be applied.

(v) Habitat Destruction & Loss of Biodiversity

The larger Site is still within a natural and generally undisturbed state although not regarded as in a pristine condition as it bears evidence of past agricultural activities (see Section 5.6). The drainage channels and Kuiseb River, which dissects the Site to the eastern part, are however regarded and classified as pristine and highly sensitive. From an ecological perspective the area is by no means ecologically unique or protected although it is expected to potentially accommodate some protected species under the Forestry Ordinance No. 37 of 1952 and Nature Conservation Ordinance No. 4 of 1975 (see Section 5.7.4). The most important larger trees/shrubs are viewed as the various protected species and species of conservation concern and include *Aloe litoralis*, *Commiphora dinteri*, *Cyphostemma bainesii*, *C. currorii* and *Heteromorpha papillosa*. None of the important faunal species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected by the Kuiseb Country Estate development.

The larger Site is still within a natural and fairly undisturbed state. The introduction of human activities on a daily basis can place an increased strain on the fauna and flora species if not managed correctly. Impacts during the operational phase are predominantly associated with the daily operations of humans and poor management practises (e.g. improper waste management, uncontrolled fires, etc.) and irresponsible behaviour (e.g. uncontrolled access to sensitive areas; collecting of plants or animals; killing of snakes, use of general poison, etc.).

It is thus extremely important that all residents and staff be made aware of the ecological sensitivity of the area and be educated on the negatives of irresponsible behaviour. Should nothing be done from the side of Property Owners Association, the long term impact is expected to have a ***high*** significance as it will have the potential to degrade the ecological value of the natural environment and that of the Kuiseb Country Estate, while with proper and strict measures in place the impact is expected to be ***very ow***. Strict mitigations (Table 8.15) should be applied and continues monitoring is necessary.

(vi) Socio-economic Contribution

The socio-economic character of the surrounding area is still mainly agricultural farmland with commercial cattle farming being the most prominent activity, although other types of activities (i.e. tourism; educational; commercial) are also found within the larger area (see section 5.4).

The proposed Kuiseb Country Estate is expected to have a direct and indirect positive socio-economic impact to both the Proponent and the surrounding communities (see section 7.3).

8.3 MITIGATORY MEASURES

The tables below list various mitigation measures to be implemented during both the construction and operational phases of the proposed Kuiseb Country Estate development. The Construction Environmental Management Plan (Appendix F) contains much more detailed mitigatory measures to be implemented during especially the construction phase, while plans to be implemented during the operational phase are listed under section 8.2.

Table 8.14 – Summary Table of all Potential Construction-related Impacts with mitigations

Impact Description	Mitigation (Elaborated on in the CEMP)
CONSTRUCTION PHASE	

Ground and Surface Water Pollution	• For purpose of the construction phase chemical toilets should be provided on-site and within close walking distance to daily construction activities. Chemical toilets should be maintained in a clean and tide state and emptied at the Gammams sewer ponds.
	• Vehicle and plant servicing areas, vehicle wash bays and lubrication bays (if intended) should, as far as possible, be located within roofed areas. The drainage in these covered areas should be connected to a wastewater tank to be emptied on a regular basis at the Gammams sewer ponds.
	• Ensure proper maintenance of all construction vehicles and equipment, and conduct continues maintenance and check-ups. Ensure that oil/ fuel spillages from construction vehicles and machinery are minimised and that where these occur, that they are appropriately dealt with. Oil leakage or spillage should be contained and cleaned up immediately. Drip trays must be placed underneath construction vehicles when not in use to contain all oil that might be leaking from these vehicles.
	• Cement should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the sides.
	• All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 120% of the storage capacity of the largest tank to prevent spilled oil, fuel and chemicals from reaching the environment. The Contractors should prepare guidelines and procedures (Detailed Preparedness and Emergency Plan) for immediate clean-up actions following any spillages of oil, fuel or chemicals. Contractor should submit a Method Statement for the purpose of handling and storage of hazardous materials on-site. It is recommended that cleaning methods and products with environmentally-friendly ingredients be used to preserve human health and environmental quality.
	• A Construction Waste Management Plan should be drafted and implemented for the duration of the construction period. This Plan should include the following as a minimum -
	  ◦ Skips and bins should be strategically placed within the construction site.
	  ◦ The skips and bins at the construction site should be adequately designed and covered to prevent access by vermin and minimize odour.
	  ◦ The skips and bins at the construction site should be adequately covered to prevent a dust nuisance or from rainwater entering.
	  ◦ The skips and bins at both the construction campsite and construction site should be emptied regularly to prevent overfilling.
	  ◦ Disposal of the contents of the skips and bins should be done at the Kupfferberg Waste Site (Windhoek).
	• The Construction Environmental Management Plan (Part 2 – Environmental Specifications) provides detail specifications and requirements to avoid any potential impacts.

Erosion & Sedimentation	• Apply acceptable engineering standards and design, or Best Management Practices (BMP). BMPs are defined as physical, structural, and/or managerial practices, that when used singly or in combination, prevent or reduce the expected impact/s. Structural BMPs typically include sediment ponds or traps, stabilized construction entrances, filter fences, check dams, and riprap. Managerial BMPs include preserving the natural vegetation, leaving buffer zones, and providing dust control. • A temporary Erosion and Sedimentation Control Plan should form part of the Construction Environmental Management Plan, to ensure that erosion, sedimentation, and chemical pollutants are prevented from entering the minor drainage channels leading to the Kuiseb River. • Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms. Sand should be stockpiled away from drainage channels and low berms need to be placed around sand heaps. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. • Plan the timing of construction to avoid clearing and grading during erosive high rainfall months of the year. If excavation cannot be avoided during rainy seasons, temporarily exposed soil surfaces should be covered e.g. by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. • Avoid unnecessary and excessive vegetation clearance and disturbance of top soil. Topsoil stockpiles must also be subject to erosion control measures. Earthworks' final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out as soon as practical after the final surfaces are formed to prevent erosion caused by rainstorms. • All ground surfaces that will be disturbed during construction must be stabilized and restored as construction progresses.

	• Complete pipe trench excavation and backfilling sequentially. • Protect steep slopes with gabion structures where applicable. • Direct surface run off away from excavated / construction areas. • Re-establish natural vegetation as soon as possible after construction. • Contractor should draft a Rehabilitation Plan and revegetate exposed areas once construction at the particular area ceased. The mitigation for the slope cutting should include slope landscaping and minimisation of the areas affected by slope cutting. The Rehabilitation Plan should provide for a phased approached ensuring that no area is exposed to natural elements (e.g. wind, water). • It is essential that the appointed Contractor prepare and implement a contingency plan to respond to the event of failure of the Erosion and Sedimentation Control Plan. • Part 2 – Environmental Specifications of the Construction Environmental Management Plan provides detail specifications and requirements to avoid any potential impacts.
Habitat Destruction and loss of Biodiversity	• Show overall environmental commitment by adapting a 'minimalistic damage' approach. Vegetation clearance should be restricted to the areas to be used for houses or within the footprint of the roads. • The Construction Site should be placed within area to be disturbed as part of the proposed development's operation (e.g. road, housing footprint). • Conduct a Vegetation Survey prior to any construction activities to establish protected/endangered species to be incorporated into the proposed development site layout. Identify and mark these trees or other vegetation that should be protected (No-go areas). • Conduct a Burrow Species Survey within the footprint of the proposed Development Site. In the event of burrow species found within the Site's footprint appropriate methods should be applied to scare these species from their existing habitat to relocate elsewhere. This should be done by a professional ecologist. • Avoid clear felling i.e. removal of all the indigenous trees/shrubs and grasses of the area prior to development. If required to remove indigenous trees introduce a policy of re-establishing (i.e. planting) 2 indigenous tree species for each indigenous species removed. Avoid the removal of the protected species i.e. *Albizia anthelmintica*, *Aloe litoralis*, *Boscia albitrunca* and *Ziziphus mucronata* – as far as possible. Incorporate the protected species as well as some of the other bigger tree/shrub specimens in the overall final landscaping of the area. The bigger tree/shrubs often serve as habitat to a myriad of indigenous fauna – e.g. loose bark, cavities, etc. Indigenous species also require less maintenance and water than exotic species. • Avoid the use of herbicides in the area due to the tributaries draining towards the Kuiseb Dam. Use mechanical methods rather. • Avoid development in and destruction of the drainage lines throughout the area. Infrastructure should not be constructed in drainage areas. These areas should be marked as No-go areas. Erect fences where practical along the boundary of construction sites before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel into adjacent areas. Check the work site boundaries regularly to ensure that they are not exceeded and that no damage has been caused to surrounding natural habitats. • Avoid introducing potential invasive alien species – e.g. *Lantana*, *Opuntia*, *Tecoma*, etc. species – in the eventual landscaping (i.e. ornamental plants) as these have the potential of escaping and infesting the local surroundings. Eradicate and remove the invasive alien species, especially the individual *Prosopis* species located throughout the surrounding areas. • Restrict construction vehicle movement to the site and restrict movement into the No-Go areas or beyond the construction site boundaries. Use designated pre-demarcated routes having the least possible impact. • No hunting, trapping, setting of snares or any other disturbance of any fauna species. • Prohibit and prevent open fires within the construction site boundary during construction and provide temporary firefighting equipment in all work areas. • A Rehabilitation Plan as proposed in the EMP should address all aspects of the natural environment prior to operation. • Part 2 – Environmental Specifications of the Construction Environmental Management Plan provides detail specifications and requirements to avoid any potential impacts.
Construction Noise & Vibration	• Use equipment that is properly fitted with noise reduction devices such as mufflers. Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music should be allowed on Site. • The Contractor shall not use sound amplification equipment on Site unless in emergency situations. • Operate noise-generating equipment during regular working hours (e.g. 8 am – 5 pm work days) to reduce the potential of creating a noise nuisance. • Construction workers operating equipment that generates noise should be equipped with noise protection. It is recommended that workers operating equipment generating noise of ≥ 80 dBA (decibels) continuously for 8 hours or more should use ear muffs. Workers experiencing prolonged noise levels 70 - 80 dBA should wear earplugs.

	• Should blasting be required all residents as per the legal requirements should be informed. Blasting times must be limited to the hours from 10:00 to 16:00 during weekdays only. Blasting should be considered as the last option for preparing the surface for foundations. • The Construction Environmental Management Plan (Part 2 – Environmental Specifications) provides detail specifications and requirements to avoid any potential impacts.
Dust & Emissions	• Removal of vegetation should be restricted to the minimum and what is necessary to avoid any unnecessary open areas (e.g. sources for dust generation). • Construction activities during high winds should be limited to those activities not generating dust. • Handling and transport of erodible materials should be avoided under high wind conditions. Raw materials such as sand should be adequately covered within the trucks to prevent any escaping into the air and along the roadway. • Stockpile of dusty materials should be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet. • Cement should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the sides. • Appropriate dust suppression measures should be used when dust generation is unavoidable particularly during prolonged dry periods. Such measures shall also include the use of temporary stabilising measures. Effective dust screens, sheeting or netting should be provided to restrict dust from being blown towards the RD1418. • No fires should be allowed on-site for any what purpose and construction waste are not allowed to be burned on-site. • It is imperative that all machinery and vehicles on site is road worthy and do not give rise to excessive smoke or emissions. • Where unavoidable, construction workers working in dusty areas should be provided and fitted with respirators. • The Construction Environmental Management Plan (Part 2 – Environmental Specifications) provides detail specifications and requirements to avoid any potential impacts.
Visual Aesthetics & Sense of Place	• Keep as much natural vegetation on site as possible to minimise the impact of construction scares and construction equipment to the landscape. • Restrict the amount of structures on site and restrict the height to a maximum of 3 meters, where possible. • The construction site should be situated as low as possible on the larger Site and as far as possible from the RD1418. • The mitigation for slope cutting (e.g. water reservoir and buildings) should include slope landscaping and minimisation of the areas affected by slope cutting. • If required, structures should be painted in natural colours to lessen the visual impact. • Keep the construction site tidy and clean of any construction waste, especially over weekends. • Part 2 – Environmental Specifications of the Construction Environmental Management Plan provides detail specifications and requirements to avoid any potential impacts.
Health, Safety and Security	• Ensure that all construction personnel are properly trained depending on the nature of their work. • Provide for a first aid kid and properly trained person to apply first aid when necessary. A lead person should be identified and appointed to be responsible for emergencies occurring on the site. This person should be clearly identified to the construction workers. • Restrict unauthorised access to the site and implement access control measures. • Clearly demarcate the construction site boundaries along with signage of no unauthorised access. Clearly demarcate dangerous areas and no go areas on site. • Staff and visitors to the site must be fully aware of all health safety measures and emergency procedures. • The contractor must comply with all applicable occupational health and safety requirements. The workforce should be provided with all necessary Personal Protective Equipment including earplugs. • All construction personnel should be made aware of the dangers of sexually transmitted diseases. A wellness program should be initiated to raise awareness on health issues. • Ensure a suitable refuse removal system as refuse would attract species such as Baboons, Black-backed jackal, etc. which would result in problem animal related issues. • The Construction Environmental Management Plan (Part 2 – Environmental Specifications) provides detail specifications and requirements with regards to safety of construction workers.

Traffic Safety	• Appropriate signs should be placed along the RD1418 notifying road users of the construction activity and roads used by construction vehicles. • Drivers of construction vehicles should have valid driver's licenses with ample experience on proper road usage and manners on-site as well as when making use of public roads. • Construction vehicles' need to be in a road worthy condition and maintained throughout the construction phase. • Raw materials such as sand should be adequately covered within the trucks to prevent any escaping into the air and along the RD1418. • Part 2 – Environmental Specifications of the Construction Environmental Management Plan provides detail specifications and requirements to avoid any potential impacts.
Natural Resources	• Restrict resource usage to the necessary. • Educate construction personnel on water wise practise and efficient use of resources. • Identify alternative resources to be used instead of conventional resources.
Heritage/ Archaeological Resources	• In the event of any remains be discovered all construction activities should immediately be ceased. Details with regards to the procedure to follow is defined in the EMP. • The Construction Environmental Management Plan (Part 2 – Environmental Specifications) provides detail specifications and requirements to avoid any potential impacts.

Table 8.15 – Summary Table of all Potential Operational-related Impacts with mitigations

Impact Description	Mitigation
OPERATION-RELATED IMPACTS	
Ground and Surface Water Pollution	• The wastewater treatment plant or any of the pipes should not be located within any of the drainage channels. Disposal of treated wastewater from the treatment plants should meet the required standards as per the Effluent Standards set by the Department of Water Affairs and Forestry. Proper training of residents and staff in responsible management of the proposed wastewater treatment system is required to prevent failure with resulting implications. • Ensure that no waste is accumulating in the Estate and implement a proper waste management system. • The discharge of pesticides and herbicides in harmful quantities should be prevented. Pesticides and herbicides should not be used during periods of rainfall; and biodegradable pesticides and herbicides with short half-lives of three days or less should be used. It is recommended to rather use local indigenous flora throughout the landscaped areas and minimise any other plants, trees and lawns as part of the landscaping areas to minimise the necessity for any pesticides and herbicides. • Ensure that surface water accumulating in the Estate are channelled and captured through a proper storm water management system to be treated in an appropriate manner before disposal into the environment.
Visual & Sense of Place	• Keeping as much natural vegetation within the entire Kuiseb Country Estate as possible. Landscaping on ground level with indigenous trees and shrubs can soften the visual impact from the larger and immediate surroundings. This will increase the sense of place and make the development easier on the eye. Landscaping will further reduce noise impacts, glare and heat. • The topography of the landscape must be used to place dwellings within the slopes to minimize further visual impact. • Structures and building should be constructed or cladded with natural stone to blend with the colours of the immediate surroundings. Buildings should be painted with natural colours to promote blending with the natural environment and to lessen the visual impact. Care needs to be taken with reflective or bright surfaces so that glare is avoided. Large areas of bright colours are to be avoided although small areas of colourful accent may be used provided that the colours are chosen to compliment the environment. Generally, darker colours and neutral greys are proposed. Roofs are usually most visible and the finishes need to be chosen to reduce the visual impact from elevated positions. Neutral greys are generally most useful in making structures recessive. Thatched roofs will ensure less visual disturbance. • Light sources must be placed in such a way, or shielded, so as to provide light only to the area that needs to be lit. All light spillage and pollution must be minimised. • Introduce architectural guidelines to minimise the impact (i.e. reduce height of structure to the minimum; cover residential dwellings like structures to appear as natural as possible; etc.)

Resource Demand vs Supply	• Link up with existing bulk water supply network of NamWater.
	• Water usage should be restricted to the necessary. Green building principles and green engineering and design techniques should be applied to reduce water consumption, i.e. -
	  ◦ *Optimal utilisation of limited water resources;*
	  ◦ *User based water purifying systems, rainwater harvesting system, zero discharge sewerage systems, drip irrigation.*
	  ◦ *Encouraging or requiring water conservation and use of water saving devices, such as low-flow showerheads and toilets.*
	  ◦ *Landscaping and design;*
	  ◦ *Surrounding landscape should be low-maintenance and water efficient, avoid open standing waters, incorporation of sensitive ecological areas, indigenous planting, and boardwalks over sensitive areas, provide corridors for fauna and flora migration, keep paved surfaces to a minimum, and encourage storm water runoff over as much as possible unpaved surfaces.*
	• Rainwater harvesting and reuse of treated wastewater should be applied to substitute at least 40% of the daily water demand.

Traffic Safety	• Appropriate signs should be placed along the RD1418 notifying road users of the entrance and exit into and from the Kuiseb Country Estate. • Proper road designs (soft bends, circles etc.) should be incorporated to limit speeding and increase safety of people in the Kuiseb Country Estate. • The entrance and exit into and from the Kuiseb Country Estate should be designed as per the requirements of the Roads Authority.

Habitat Destruction and Loss of Biodiversity	• Avoid unnecessary and excessive vegetation clearance and disturbance of top soil for purpose of landscaping.
	• With regards to landscaping the following should be done –
	  ◦ Landscaping should be done using local and indigenous vegetation.
	  ◦ Lawns as part of the landscaping should be limited to the minimum.
	  ◦ No alien species should be used as part of the landscaping.
	  ◦ A landscaping master plan detailing the design and vegetation use should be done. This should be done before construction commences so that these areas be protected from construction activities.
	• Recreational activities should be done in a coordinated manner and of a minimum impact (e.g. hiking, cycling, and horseback riding). Existing tracks should be used for purpose of hiking, cycling and horseback riding to restrict any further impact to the ecology.
	• Residents should be informed and educated not to remove any plants or animals from the Site. General environmental sensitivity should be promoted and conveyed to all visitors as well.
	• Eliminate point discharges for storm water outflow and release storm water at the same rate as natural runoff restricting erosion and habitat loss.
	• Habitat corridors should be created by introducing culverts underneath the planned roads. This will enhance migration of small fauna species through the proposed development area.
	• Fencing of entire Estate or individual portions should be done not to restrict smaller animals from migrating. Fence should provide for the necessary spacing in between wires to allow smaller animals from moving freely. In the event of electrification, the bottom wires should be for alarming purpose only and not for electrocuting as this will result in various deaths, especially smaller reptiles.
	• Prevent the killing of species viewed as dangerous – e.g. various snakes – setting of snares (i.e. poaching) or collection of veld foods (e.g. tortoises).

Erosion & Sedimentation	• Engineering designs of roads should apply acceptable engineering standards and design, or Best Management Practices (BMP). BMPs are defined as physical, structural, and/or managerial practices, that when used singly or in combination, prevent or reduce the expected impact/s. Managerial BMPs include preserving the natural vegetation, leaving buffer zones, and providing dust control. • The proposed road alignment should follow the contours reducing storm water velocity and avoid unnecessary erosion, sedimentation and loss of vegetation. All storm water outlets should be provided with a sand trap to break velocity and capture road surface pollutants. • Avoid unnecessary and excessive vegetation clearance and disturbance of top soil for purpose of landscaping. Restrict landscaping to existing vegetation as far as possible.
Emissions & Dust	• No fires should be allowed within the Kuiseb Country Estate for any what purpose (except at a designated designed braai area). • No waste are allowed to be burned in the Kuiseb Country Estate. • The access road and internal roads should be covered/ tared to reduce dust nuisance where possible. • Vehicle speeds along the gravel roads should be reduced to 40 km/h to minimise dust.
Health, Safety and Security	• Restrict unauthorised access to the Kuiseb Country Estate and implement access control measures. • Clearly demarcate dangerous areas and no go areas on the Kuiseb Country Estate. • Residents and visitors to the Kuiseb Country Estate must be fully aware of all health safety measures and emergency procedures. • The Property Owners Association must provide adequate plans and information on the health and safety precautions of the Kuiseb Country Estate.

8.4 CUMULATIVE IMPACTS

The cumulative impact of the proposed development, with the implementation of all the proposed mitigation measures to minimise the overall impacts caused by the development can be expected to be ***moderate-low***.

Any new development introduced, is expected to place an increasing load on existing natural resources and infrastructure, and has both positive and negative impacts on the immediate and surrounding environment (both natural and social). The significance thereof is determined by the nature and the scale of the proposed development, as well as the sustainable mechanisms implemented as part of the construction and operational phase or a lack thereof.

Following the environmental impact assessment, the proposed Kuiseb Country Estate is expected to contribute to various cumulative impacts, for both the construction and operational phases. Although cumulative impacts cannot be entirely avoided, they ought to be significantly reduced by means of sustainable practises (which are intended at the Kuiseb Country Estate) and thorough implementation of all recommended mitigation measures and implementation of this Scoping Assessment Report and the Construction Environmental Management Plan.

It is expected that the proposed Kuiseb Country Estate development would result in the following cumulative impacts:

- Socio-economic benefits.
- Change in landscape and sense of place.
- Ecological disturbance.
- Increased load on infrastructure (e.g. electricity network; water network; road infrastructure; waste dump site).
- Increased demand for resources (e.g. water & electricity).
- Increase pollution (e.g. wastewater; domestic waste).

Considering the low-key nature (i.e. low density) and sustainable practises promoted by the proposed Kuiseb Country Estate, the cumulative impact is considered to be ***low.***

8.5 NO-GO OPTION

The scenario with or without the proposed development can be summarised as follows -

- A key development objective of the proposed development is to provide a world-class Country Estate with related activities expected to bring much needed socio-economic development to the particular area of the Khomas Region, which currently is associated with high levels of unemployment.

- The proposed Kuiseb Country Estate will enable the owner to use the currently economically unviable portion of land for a purpose having a direct economic benefit.
- Without the Kuiseb Country Estate, the perceived benefits identified (e.g. socio-economic) will not be realised and environmental impacts described in this Report will not arise either.

On balance, it is considered that the consequences (very limited) to the environment and adjacent environmental sensitive receivers, arising from both the construction and operation of the Kuiseb Country Estate, not be of any real significance compared to an agricultural activity expected to have less socio-economic benefits in both the short and long term. It should be mentioned that the development of the Kuiseb County Estate will not result in the portion of land (Portion A) losing its agricultural purpose, as the portion of land is currently not utilised for any agricultural purpose due to the portion of land not being economically viable and past stock theft.

CHAPTER 9 CONCLUSIONS & RECOMMENDATIONS

This chapter of the Report presents the assessment conclusion following the Scoping Phase, as well as the key recommendations and the environmental statement for consideration by the Authorities. The conclusion and recommendations as presented in this chapter has been drawn from the assessment outcome, as presented in Chapter 8.

9.1 CONCLUSIONS

It is the intention of the owner of Remainder of Farm Landmister No 331 to subdivide his property into a portion of 400ha (Portion A), which currently is dissected by the DR1418 from the remaining Farm and have become economically unviable for further commercial farming purpose, which he intend to further subdivide into 27 low density (1 dwelling per portion) residential portions, which will be known as the Kuiseb Country Estate. The Remainder of the Farm Landmister No 331 is situated approximately 52 km south-west of Windhoek, just north of the Friedenau Dam, Khomas Region (see Figure 1.1 - Locality Map).

The proposed project includes certain activities that are listed as 'Listed Activities' according to Government Notice No. 29 of 6 February 2012, which requires that an Environmental Clearance Certificate (ECC) be obtained from the office of the Environmental Commissioner, thus requiring that an Environmental Impact Assessment (EIA) to be conducted.

The Proponent commissioned this EIA and appointed Urban Green cc to undertake the necessary study (i.e. Scoping Assessment), as prescribed by the Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), to enable an application for an Environmental Clearance Certificate with the Environmental Commissioner as required by Section 27(3) of the Environmental Management Act (No. 7 of 2007).

Given the nature of the proposed Kuiseb Country Estate, evaluated against the sensitivity of the receiving environment, it seems inevitable that the proposed development would have an impact on its receiving socio-economic and biophysical environment, some of greater potential significance and others of less.

Following the environmental scoping assessment, the following can be concluded:

- The greatest sensitivity of the receiving environment is within the geohydrological aspect, as drainage from the Site takes place towards the Kuiseb River passing through Portion A feeding into the downstream water resources (i.e. localised boreholes and the Friedenau Dam) along the Kuiseb River. The geohydrological nature characterises low groundwater potential and low risk of groundwater contamination through direct infiltration, which is considered a great benefit. However, the sensitivity increases along the drainage channels

and river, which consists of alluvium having a moderate to high groundwater potential and associated higher risk of groundwater pollution.

- It is thus extremely important that surface water flow towards the drainage channels and river, which may contain pollutants of different sorts, be managed and treated in such a manner not to cause any potential pollution of the immediate and surrounding receiving environments. The necessary mitigations to achieve a zero pollution factor have been proposed within the this Scoping Report and the Construction Environmental Management Plan.

- From an ecological perspective, Portion A is still within a natural and generally undisturbed state although not regarded as in a pristine condition as it bears evidence of past agricultural activities. The drainage channels and Kuiseb River, which dissects the Site to the eastern part, are however regarded and classified as pristine and highly sensitive. From an ecological perspective the area is by no means ecologically unique or protected although it is expected to potentially accommodate some protected species under the Forestry Ordinance No. 37 of 1952 and Nature Conservation Ordinance No. 4 of 1975. The most important larger trees/shrubs are viewed as the various protected species and species of conservation concern and include *Aloe litoralis*, *Commiphora dinteri*, *Cyphostemma bainesii*, *C. currorii* and *Heteromorpha papillosa*. None of the important faunal species are exclusively associated with the Friedenau Dam area nor expected to be adversely affected by the Kuiseb Country Estate development.

  - Unnecessary removal of vegetation to make way for infrastructure and buildings should be limited to the necessary, while the removal of protected species should not be allowed. It is important that an ecological survey precedes the construction of services and buildings so as to identify and mark sensitive habitats and protected species to be incorporated into the development.

- The overall cumulative impact of the proposed development on resources (i.e. water and electricity, and waste accommodation) is expected to be low (although this still need to be confirmed with the respective service providers), mainly as a result of the low density nature and sustainable practises promoted.

Based on the baseline information as provided by the Environmental Specialists, the Project Team and Proponent, this Scoping Assessment Study after following the above evaluation concludes that there is currently no evidence indicating that any of the impacts identified are of <u>such significance that it cannot be mitigated</u> and that the proposed Kuiseb Country Estate, as presented in this Report, could not be allowed to continue. <u>It is however required that the recommendations as presented below first be satisfied with approval from the Environmental Commissioner before the Kuiseb Country Estate can commence.</u>

9.2 RECOMMENDATIONS

It is therefore recommended that the proposed Kuiseb Country Estate be approved subject to the following recommendations:

- All required permits, licenses and approvals (see section 4.2.2) for the proposed development be obtained before the development takes place.
- Approvals be obtained from both Namwater and Nampower for bulk services delivery.
- All mitigations listed in Tables 8.14 and 8.15, and the Construction Environmental Management Plan be implemented prior and during construction and operational phases.
- An Environmental Control Officer be appointed during the construction phase of the proposed development to make sure all the requirements within the Scoping Report and Construction Environmental Management Plan are adhered to.
- An integrated solid waste management plan should be drafted and implemented focussing on (i) reduce, recycle and reuse to minimise the amount of waste to be removed from site; and (ii) proper handling storage, removal and disposal of all waste types.
- In the event that material is sourced from nearby quarries it is required that the necessary approval (i.e. environmental clearance certificate) be obtained by the appointed Contractor.
- That various Green Building Designs and Principles be applied in making the proposed development sustainable.
- Continued public participation should form part of the construction phase.
- The final alignment of the internal road, electricity lines, water reservoir and water lines should be done in consultation with an ecologist following the proposed vegetation survey.
- A fire management plan or disaster management plan should be drafted for the proposed development for both the construction (appointed contractor) and operational phases (Property Owners Association).
- A landscaping master plan detailing the design and vegetation to be used should be drafted and implemented by an ecologist.
- Before construction commences it is recommended to conduct an ecological survey to ensure that all protected species be marked as no-go areas for development.
- Continued on-site monitoring and evaluation be conducted during the construction and operational phases to be authorised by the DEA and KRC.
- That an Environmental Audit Report be compiled once the construction phase is completed and submitted with both the Directorate of Environmental Affairs (MET).

9.3 ENVIRONMENTAL STATEMENT

Based on the information presented in this Scoping Report, the Environmental Assessment Practitioner and Specialist are of the opinion that the immediate and larger environment will not be significantly impacted given that the above recommendations as proposed in this Report be implemented and monitored, and responsible environmental practises be applied by the Proponent, contractors and sub-consultants, as well as the Property Owners Association.

Urban Green cc, the independent environmental assessment practitioner, recommend to the relevant authorities that the application for the proposed Kuiseb Country Estate be approved on condition that the above recommendations (section 9.2) be met and that continues monitoring be conducted as per the Environmental Management Act (Act No. 7 of 2007) and this Scoping Report. It is important that proof of monitoring be submitted with the office of the Environmental Commissioner for review of Environmental Clearance renewal after 3 years.

IT IS IMPORTANT TO STATE TO ALL COMPETENT AUTHORITIES, THAT ENVIRONMENTAL IMPACT ASSESSMENTS HAVE VERY LITTLE VALUE IN CONTRIBUTING TO SUSTAINABLE ENVIRONMENTAL PRACTISES IF NOT IMPLEMENTED BY THE PROPONENT AND EQUALLY IMPORTANT IF NOT MONITORED AND REGULATED BY THE RESPONSIBLE AUTHORITIES.

THIS STUDY AND REPORT DOES NOT PREVENT ANY OF THE EXPECTED IMPACTS FROM NOT TAKING PLACE, BUT CAN ONLY BE ACHIEVED THROUGH ON-SITE CONSTRUCTION MONITORING AND CONTINUES OPERATIONAL MONITORING.

IT HAS THUS BECOME IMPORTANT THAT CONSTRUCTION MONITORING AND AUDITING OF DEVELOPMENTS BE DONE AS PER THE APPLICABLE LEGISLATION AND THAT THIS BE MADE PART OF ALL APPROVALS ISSUED BY THE AUTHORITIES.

REFERENCES

Alexander, G. and Marais, J. 2007. A guide to the reptiles of southern Africa. Struik Publishers, Cape Town, RSA.

Barnard, P. 1998. Under protected habitats. In: Barnard, P. (ed.). Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.

Bethune, S, 2008. Water Resources Management Plan for the Kuiseb Basin - Environmental Issues in Kuiseb Basin Pertinent to River Basin Management, Wetlands Working Group of Namibia

Cunningham, P.L. 1998. Potential wood biomass suitable for charcoal production in Namibia. *Agri-Info* 4(5): 4-8.

Cunningham, P.L. 2006. A guide to the tortoises of Namibia. Polytechnic of Namibia, Windhoek, Namibia.

Curtis, B. and Mannheimer, C. 2005. Tree Atlas of Namibia. National Botanical Research Institute, Windhoek, Namibia.

Giess, W. 1971. A preliminary vegetation map of South West Africa. *Dinteria* 4: 1 – 114.

Geological Survey of Namibia. 1:250,000 Geological Series (Provisional). 1997.

Mannheimer, C. and Curtis, B. (eds) 2009. Le Roux and Müller's field guide to the trees and shrubs of Namibia. Macmillan Education Namibia, Windhoek.

Mendelsohn, J., Jarvis, A., Roberts, A. and Robertson, T. 2002. Atlas of Namibia. A portrait of the land and its people. David Philip Publishers, Cape Town, RSA.

Ministry of Environment and Tourism, 2013. MET. [Online] Available at: http://www.met.gov.na/Pages/EnvironmentalManagement.aspx [Accessed 29 January 2014].

Namibia Tourism: Your guide to Namibia. [Online] Available at: http://www.namibiatourism.org/place/dorob-national-park [Accessed 28 January 2014].

Namibian Ministry of Water and Forestry, unknown. Kuiseb River Basin. [Online] Available at: http://www.mawf.gov.na [Accessed 8 August 2014].

National Heritage Council Namibia. 2013. (www.nhc-nam.org) Official Gazette 1616, No. 325, 1951. Vogt, Official Gazette 1616, No. 325, 1951. Vogt, Andreas, \\\"National Monuments in Namibia\\\", Windhoek 2004, p.7-8. Heinz, R., \\\"Die Saurierfaehrten bei Otjihaenamaparero im Hereroland und das Alter.

The National Planning Commission of Namibia. 2011. Namibia 2011 Population and Housing Census Preliminary Results. (www.npc.gov.na)