

06 April 2023

The Environmental Commissioner  
The Ministry of Environment, Forestry and Tourism  
Directorate of Environmental Affairs  
Private Bag 13346  
Windhoek

MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM
DIRECTORATE OF ENVIRONMENTAL AFFAIRS
11 APR 2023
RECEIVED Signature: 

Attention: Mr T. Mufeti

**RE: APPLICATION FOR AN ENVIRONMENTAL CLEARANCE CERTIFICATE FOR PURPOSE OF A PERMIT FOR INCREASED GROUNDWATER ABSTRACTION FROM THE STAMPRIET ARTESIAN AQUIFER (HARDAP REGION)**

Urban Green cc (The Environmental Assessment Practitioner) has been appointed by BV Investments Two Hundred and Sixty Five CC (The Proponent) and owner of the Remainder of Farm Sponholz No. 140, to apply for an Environmental Clearance Certificate and conduct the required environmental assessment for the increase in abstraction of groundwater for cultivation of olive and almonds at the Remainder of Farm Sponholz No. 140, located along the M33 ±30km south of Stampriet village in the Hardap Region.

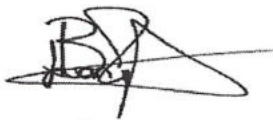
The Environmental Scoping Assessment was conducted as per Regulation 6 of the EIA Regulations (GN. No. 30 of 2012), which included as the first step the registration of the application for an Environmental Clearance Certificate (ECC) as per Regulation 6 of the EIA Regulations.

**In accordance with Section 32 of the Environment Management Act (EMA) (No. 7 of 2007) all applications for an ECC should be submitted to the relevant Competent Authority. In accordance with Section 32 of the EMA the relevant Competent Authority identified for this particular project is the Ministry of Agriculture, Water and Land Reform.**

Given the above, find attached the Final Scoping Report for the proposed project, for evaluation and consideration for an ECC by the Environmental Commissioner.

Should your office require any further information and/or assistance, please contact us.

Yours faithfully,



Brand van Zyl

# **ENVIRONMENTAL SCOPING ASSESSMENT**

## **INCREASE IN GROUNDWATER ABSTRACTION AT THE REMAINDER OF FARM SPONHOLZ NO.140**

### **ENVIRONMENTAL SCOPING REPORT**

**APRIL 2023**



## **PROJECT INFORMATION**

**Proponent: BV INVESTMENTS TWO HUNDRED AND SIXTY FIVE CC**

**Project Title: INCREASED GROUNDWATER ABSTRACTION AT  
THE REMAINDER OF FARM SPONHOLZ NO. 140**

**Type of Project: ENVIRONMENTAL SCOPING ASSESSMENT**

**Project Location: STAMPRIET – HARDAP REGION (NAMIBIA)**

**Project EIA Portal Number: 0025**

**Competent Authority: MINISTRY OF AGRICULTURE, WATER AND LAND REFORM  
PRIVATE BAG 13184  
WINDHOEK**

**Approving Authority: MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM  
DEPARTMENT OF ENVIRONMENTAL AFFAIRS  
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## LIST OF ACRONYMS

BID	Background Information Document
°C	degrees Celsius
CBD	Convention on Biological Diversity
DEA	Directorate of Environmental Affairs
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner
ECB	Electricity Control Board
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMA	Environmental Management Act
EMP	Environmental Management Plan
EU	European Union
FSR	Final Scoping Report
GDP	Growth Domestic Product
Ha	Hectare
I&AP	Interested and Affected Parties
IGRAC	International Groundwater Resource Assessment Centre
IPM	Integrated Pest Management
IPP	Independent Power Producer
IWRM	Integrated Water Resource Management
kVA	Kilowatts Ampère

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L	Litre
MAWLR	Ministry of Agriculture, Water and Land Reform
MET	Ministry of Environment and Tourism
MEFT	Ministry of Environment, Forestry and Tourism
NIRP	National Integrated Resource Plan
O&M	Operations and Maintenance
PPP	Public Participation Process
PV	Photovoltaic
ToR	Terms of Reference
SAB	Stampriet Artesian Basin

## GLOSSARY OF TERMS

**Alternatives** - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The “no-go” alternative constitutes the ‘without project’ option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

**Assessment** - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

**Aquifer** - An underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials.

**Artesian water** – Water that is confined in an aquifer between impermeable beds and is under pressure, like water in a pipe. When a well or fracture intersects the aquifer, water rises in the opening, producing a flowing well or an artesian spring.

**Cation** – An atom with more protons than electrons, consequently giving it a net positive charge. For a cation to form, one or more electrons must be lost, typically pulled away by atoms with a stronger affinity for them.

**Conductance** - the expression for the ease of the passing of the electrons.

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**Critically Endangered (IUCN)** - A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V of the IUCN Red List Categories and Criteria<sup>1</sup>), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

**Cumulative Impacts** - In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Endangered (IUCN)** - A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V of the IUCN Red List Categories and Criteria<sup>2</sup>), and it is therefore considered to be facing a very high risk of extinction in the wild.

**Environment** - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

**Environmental Impact Assessment (EIA)** - The process of examining the environmental effects of a development as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012) for activities listed as List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).

**Environmental Management Plan (EMP)** - A working document on environmental and socioeconomic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

**Erosion** - The detachment, transport and deposition of soil particles by water, wind, ice and gravity.

**Evaluation** – the process of ascertaining the relative importance/significance of information, in light of people's values, preference and judgements in order to make a decision.

**Hazard** - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

**Interested and Affected Party (I&AP)** - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

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<sup>1</sup> Available at [http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist\\_cats\\_crit\\_en.pdf](http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf)

<sup>2</sup> Available at [http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist\\_cats\\_crit\\_en.pdf](http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf)

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**Mitigate** - The implementation of practical measures to reduce adverse impacts.

**Protected** - Protected under Namibian legislation.

**Proponent** - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment, Forestry & Tourism.

**Public** - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

**Public consultation** - The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**IUCN Red List** - The IUCN Red List of Threatened Species™ is widely recognised as a comprehensive, objective global approach for evaluating the conservation status of plant and animal species.

**Salinisation** - Accumulation of water-soluble salts in soil to a level where agricultural production and ecosystem quality are negatively affected.

**Scoping Process** - Process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

**Significant Effect/Impact** - Means an impact that by its magnitude, duration, or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Sustainable Development** – Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations.

**Species of Special Concern** - Those species listed in the Endangered, Threatened, Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed

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in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).

**Sub-artesian** - Water that rises naturally in a well to a height appreciably above that of the surrounding water table, but does not flow out of the well.

**Topsoil** - The top 150 mm of soil (topsoil) and root material of cleared vegetation.

**Vulnerable** - A taxon is vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of the IUCN Red List Categories and Criteria<sup>3</sup>), and it is therefore considered to be facing a high risk of extinction in the wild.

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<sup>3</sup> Available at [http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist\\_cats\\_crit\\_en.pdf](http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf)



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## EXECUTIVE SUMMARY

BV Investments Two Hundred and Sixty-Five cc (The Proponent) is of the intention to increase groundwater abstraction for irrigation purposes in the Stampriet Artesian Basin (SAB) on the Remainder of Farm Sponholz No. 140. The farm is situated approximately 30 km south, south-east of Stampriet Village in the central eastern parts of the Hardap Region. Refer to Fig. 1.2-1.

The farm owner is in possession of abstraction Permit No. 10405 to abstract groundwater for irrigation purposes from two boreholes (WW364 and WW31758). The permit quota is for 42 000 m<sup>3</sup>/a, while the increased quota applied for is 430 000 m<sup>3</sup>/a. Permit No. 10405 expired on 7 May 2021 and an application for the renewal of the permit was submitted to the MAWF, but renewal is awaited.

The abstraction of ground or surface water for commercial purposes and development of irrigation schemes for agriculture are listed activities (GN. No. 29 of 2012). In accordance with the Environmental Management Act, (Act No. 7 of 2007) and within the framework of the Environmental Impact Assessment Regulations (2012), Urban Green cc (EAP) has been appointed by the Proponent to undertake an Environmental Scoping Assessment and apply for an Environmental Clearance Certificate.

The Agriculture sector in Namibia plays an important role in the economy as it supports the livelihoods and create employment for the majority of the population. In the successive series of National Development Plans of Namibia, the Agriculture sector has been singled out as one of the priority sectors of the country. Namibian policy makers are, however, aware that water is a scarce and valuable resource. Therefore, an economic value is placed on water in order to include environmental externalities in the water costs and to encourage efficient and sustainable resource supply.

The Stampriet Artesian Basin (SAB) is shared by Namibia, Botswana and South Africa. The presence of fresh water is of special value in the very arid environment where brackish and saline groundwater frequently occur. Although all three countries share the groundwater basin, only Namibia makes significant use of it, since the natural conditions, i.e. groundwater occurrence and quality are more favourable on the Namibian side.

The legislation applicable to the study is addressed in Chapter 3 of this report. The Department of Water Affairs and Forestry for Namibia (DWAf) within the Namibian Ministry of Agriculture, Water and Land Reform has a Geohydrology Division, which is responsible for all water resource development projects in the country, including irrigation planning and development. Groundwater extraction and management in Namibia is controlled through a permit system and the activities of local water user committees. In view of concerns on the part of both local water users and the government about possible over-extraction of water in the SAB in Namibia, an aquifer management committee, the so-called Stampriet Basin Water Committee (SBWC), was formed to assist the Department of Water Affairs and Forestry in monitoring water utilization in the basin.

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The successful implementation and operation of this committee, could not be confirmed during this study.

A description of the proposed development is given in Chapter 4 of this report. The Remainder of Farm Sponholz No 140 of 5 642 ha is predominantly used for livestock farming (sheep and cattle) and indigenous game grazing on natural vegetation. It is envisaged that the increase in groundwater will be used to develop and cultivate an olive and almond orchard to the extent of 100 ha in total. There is currently a trend in the world food market to make use of healthier oils, such as olive-, almond-, palm-, coconut oil, etc. It is projected that this trend will grow and that the demand will increase further in the near future. The produce is destined for the local market, as well as export to neighbouring South Africa and the European Union. This project is thus in line with the goals of the Namibia Agriculture Policy 2015 to increase agricultural production and productivity, to accelerate its contribution to National Growth Domestic Product (GDP) and to develop the agriculture sector across the value chain.

The development of the orchard is envisaged on top of the plateau that fringes the Auob River Valley on the flat area of the first inter-dune street. Guided by input from neighbouring land owners, it is envisaged to develop the orchard in phases of 20 ha per year over a five-year period to monitor the effect on groundwater and feasibility.

New agronomic farm management technology (such as CropX) is available to gather data on soil composition, soil moisture and climatic conditions. The implementation of such systems can help farmers monitor the health of irrigation fields and crops and can prevent run-off water that might pollute groundwater. Soil analysis, -preparation and a -feeding program will play an important role in crop production in this arid area with relatively low fertility.

Irrigation will take place by means of drip sprinklers year round with decreased water supply only during the winter months when trees are dormant. Drip irrigation is a type of micro-irrigation that has the potential to save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil or buried below the surface (which is recommended in this arid scenario). It causes maximum use of available water for infiltration in soil, less evaporation losses, high efficiency in the use of fertilizers with limited to no runoff of fertilizers into ground water.

The affected environment is addressed in Chapter 5. The physical environment is typical of the *Southern Kalahari* biome found within the south-eastern parts of Namibia. Low vegetated dunes run in a north-west to south-east direction with flat areas (“streets”) in between dunes. The farm falls within the Kalahari Group with Kalahari Sand Rock Type. The north-eastern part of the farm (including the homestead and current irrigation fields) lies within alluvial soils (*Eutric Flavisols*) of the Auob River Valley. Stretching westward, the soil becomes the general soil type of the Kalahari (*Ferralic Arenosols*) which forms longitudinal dunes alternated by inter-dune valleys covered with *Arenic Calsisols*, where the orchard development is envisaged. *Calsisols* can be productive under irrigation with proper management practices for fertilization and to prevent salinization and erosion.

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Plant diversity is low with an estimate of between 50-99 species recorded. It is estimated that at least 45 reptile, 3 amphibian, 47 mammal and 131 bird species are known to or expected to occur in the general area. The Hardap Recreation Resort is the nearest protected area, situated around the Hardap Dam to the west of the Project Site and upstream of the nearest ephemeral rivers as well as on the western side of the SAB. The protected area approximately 60 km to the west of the farm will not be affected by the agronomic activities, increased water abstraction or possible groundwater pollution of the proposed Project.

The Project Site is situated approximately 30 km south, south-east of Stampriet village and 40 km north, north-east of Gochas village. It is located approximately 19 km upstream of NamWater's Gochas Water Supply Scheme. Groundwater levels and - pollution on the Project Site might thus have the potential to negatively affect water supply to Gochas village.

The visual aesthetics and sense of place in the natural environment of the Remainder of Farm Sponholz No. 140 is typical Kalahari veld with red sand, waving grass, acacia shrubs, Shepherd and Camelthorn trees. The Project Site where the orchard development is envisaged, is towards the north-west of the homestead on the plateau that fringe the Auob River Valley in the flat area before the first longitudinal dune and will not be visible to passers-by on the M33 Main Road between Stampriet and Gochas. Refer to Fig. 4.3-1.

The Hardap Region is located in the southern parts of Namibia and have a population size of 79 507 with an annual growth rate of 1.5 % from 2001 – 2011. Approximately 35,000 people live in the Stampriet Artesian Basin (SAB) in Namibia. They extract groundwater from aquifers in the SAB for their domestic water supply, their livestock production and for irrigation. The great majority of the local population is dependent on farming for its livelihood.

Public consultation is depicted in Chapter 6 and for the purposes of this project was prescribed by Regulations 21 to 24 of the Environmental Impact Assessment Regulations (GN. 30 of 2012). Engagement with the public and authorities as part of the first round of public consultation commenced on the 27<sup>th</sup> of September 2022 and concluded on the 18<sup>th</sup> of October 2022. During the first round of consultation, I&APs and authorities were given an opportunity to register and submit comments and/or concerns on the proposed project. Refer to Table 6.1-1 and 6.1-2 of the report.

Great concern was raised by neighbouring landowners regarding the impact this project will have on groundwater levels in the SAB along the Auob River and on their artesian water supply downstream from the Project Site. Further concerns regarding groundwater pollution were raised with reference to the Gochas Water Supply Scheme 19 km downstream of the Project Site. Interested and affected parties are concerned about how the monitoring procedures would be implemented if such a project should go ahead and who will be responsible for any negative impacts detected.

Given the nature of the activities associated with the increase water abstraction and the sensitivity of the receiving environment, a Geohydrology Baseline Assessment (attached as Appendix D) and

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an Ecological Baseline Assessment (see Chapter 5 and Appendix E) were conducted as part of the scoping stage.

The following issues were identified during the scoping assessment and public participation:

- Possible reduction in groundwater availability;
- Possible pollution of the groundwater resources;
- Loss of biodiversity and habitat destruction;
- Soil degradation.

Positive impacts identified as part of the scoping assessment are:

- This project is in line with the strategy of the National Agricultural Policy to focus on increased agricultural production, agro-processing and marketing as well as real farm income as a contribution to national household food security.
- It can contribute positively to the country's food security programme by delivering produce to the local market.
- It can contribute positively to job creation to the communities of Stampriet, Gochas and Witkrans in the Hardap Region, from where labour will be sourced and where little other economic activities take place.
- It will bring capital investment in the agricultural sector of the Hardap region.

These issues are discussed in detail in Chapter 7 and mitigation measures and recommendations are provided. It is the conclusion of the Environmental Scoping Assessment that this project has the potential to contribute positively to the country's food security in a manner that compliments the Namibia Agriculture Policy 2015. However, Namibia's arid and unpredictable climate, limited water sources, soils with inherently low fertility and poor physical properties are major constraints to limit agricultural development, especially crop farming. Natural vegetation is adapted to local soil conditions, but crops perform poorly in these marginal soils and this is reflected in low yields.

The Geohydrological Assessment determined baseline parameters from which monitoring can be undertaken, but could not predict the impact that the increased groundwater abstraction will have on the SAB. It is thus recommended that expansion of irrigation development and increased groundwater abstraction from the SAB on the Remainder of Farm Sponholz No. 140 only be done in phases of 20 ha olive trees per year over a period of 5 years. During this period rigorous monitoring of groundwater, soil and financial feasibility is required.

This must be undertaken by the Proponent and monitored by the Stampriet Water Basin Committee and the Ministry of Agriculture, Water and Land Reform. All potential impacts identified in this study on groundwater and soil as well as other impacts that might arise during implementation must be identified in time and addressed in an effective manner. Further information can only be obtained during increase groundwater abstraction and crop production and therefore proper monitoring measures must be put in place before an ECC is granted.

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It is the opinion of the EAP that a full EIA for this project will not reveal further information and is therefore not recommended. However, the need for a Strategic Environmental Assessment on the impact of irrigation development and increase groundwater abstraction from the SAB became evident during this study to determine the cumulative effect of all the recent developing irrigation schemes.

Based on the information presented in this scoping report, the Environmental Assessment Practitioner is of the opinion that the immediate and larger environment will not be significantly impacted if the above recommendations as proposed in this report are implemented and monitored, and responsible environmental practises are applied by the Proponent.

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# 1 INTRODUCTION TO THE PROJECT AND THIS REPORT

This chapter of the report provides a background and motivation to the proposed project; the study's terms of reference; study approach and methodology, purpose of this report; the assumptions and limitations of the study; and an outline of the remainder of the report.

## 1.1 PROPOSED PROJECT

The Owner of the Remainder of Farm Sponholz No. 140, is of the intention to increase groundwater abstraction for irrigation purposes in the Stampriet Artesian Basin (SAB) near Stampriet, Hardap Region, Namibia.

The Proponent is in possession of abstraction Permit No. 10405 to abstract groundwater for irrigation purposes from two boreholes (WW364 and WW31758). The permit quota is for 42 000 m<sup>3</sup>/a, while the increased quota applied for is 430 000 m<sup>3</sup>/a. Permit No. 10405 expired on 7 May 2021 and an application for the renewal of the permit was submitted to the MAWF, but renewal is awaited.

It is envisaged that the increase in groundwater will be used to develop and cultivate an olive and almond orchard to the extent of 100 ha in total on the Farm. The produce is destined for the local market, as well as export to neighbouring South Africa and the European Union.

The abstraction of ground or surface water for industrial or commercial purposes and irrigation schemes for agriculture require an Environmental Clearance Certificate (ECC) before being implemented [Section 27(3) of the Environmental Management Act, No. 7 of 2007]. To this effect BV Investments Two Hundred and Sixty Five cc (the Proponent) would like to apply with the Ministry of Agriculture, Water and Land Reform for an increase in water abstraction from two existing boreholes on the farm.

In accordance with the Environmental Management Act, (Act No. 7 of 2007) and within the framework of the Environmental Impact Assessment Regulations (2012), Urban Green cc (EAP) has been appointed by the Proponent to undertake an Environmental Scoping Assessment and apply for an Environmental Clearance Certificate for the irrigation expansion.

## 1.2 LOCALITY

The Remainder of Farm Sponholz No. 140 is situated approximately 30 km south, south-east of Stampriet village in the central eastern parts of the Hardap Region. It can be reached along the M33 Main Road that runs between Stampriet and Gochas. Refer to Fig. 1.2-1 for the Locality Map.



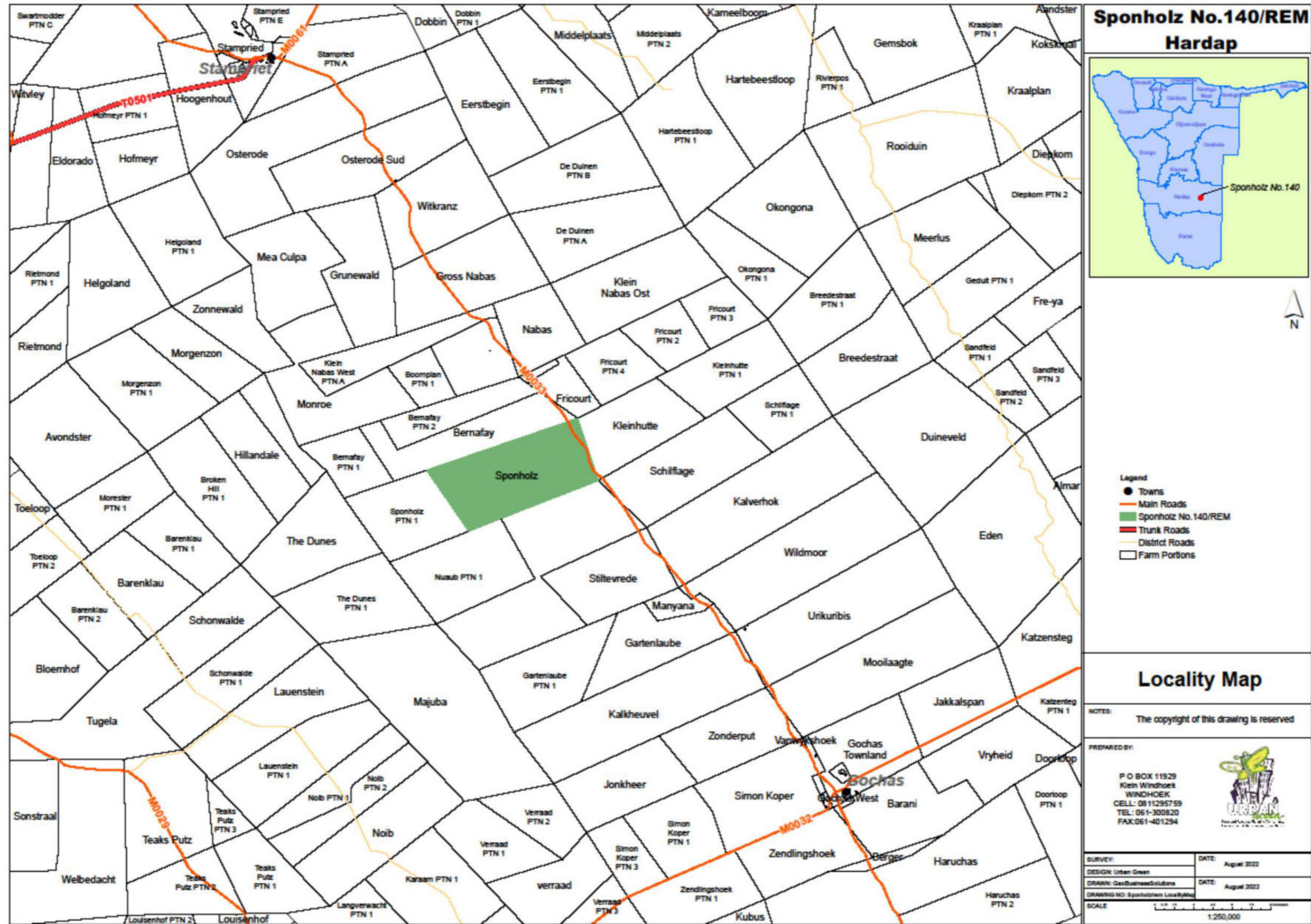


Fig. 1.2-1 – Locality Map of the Remainder of Farm Sponholz No. 140

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### **1.3 NEED FOR AND DESIRABILITY OF THE PROJECT**

The Agriculture sector in Namibia plays an important role in the economy as it supports the livelihoods and create employment for the majority of the population. In 2012, the sector provided more than 172 530 jobs in the subsistence and commercial sectors, making it the most employment intensive sector in the country. About 70 % of Namibia's population is dependent directly or indirectly on it for a livelihood. (*MAWF, 2015*)

There is currently a trend in the world food market to make use of healthier oils, such as olive-, almond-, palm-, coconut oil, etc. It is projected that this trend will grow and that the demand will increase further in the near future. (*Parcell, 2016*)

This project is in line with the goals of the Namibia Agriculture Policy 2015 to increase agricultural production and productivity, to accelerate its contribution to National Growth Domestic Product (GDP) and to develop the agriculture sector across the value chain. The proposed expansion of agronomic activities will contribute to the local as well as export markets by producing olives and almonds and its by-products.

### **1.4 STUDY TERMS OF REFERENCE**

No formal Terms of Reference (ToR) were provided, but rather were inferred from the requirements of the applicable legislation namely the Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), to enable an application for an 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 only. All other permits and/or licenses (see section 3.4) required for the operation of the proposed project still needs to be applied for by the Proponent.

### **1.5 STUDY APPROACH AND METHODS**

This EA process was carried out in accordance with provisions for EA, as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), provided for by Section 56 of the Environmental Management Act (No. 7 of 2007).

The study's approach and methods were guided by the Terms of Reference (Section 1.4) and the relevant legislation (Chapter 3).

The EA process is a planning, design and decision-making tool used to inform the relevant authorities and Proponent on what the consequences of their decisions will be in biophysical and social terms. As such, it identifies potential impacts (negative and positive) that the Project may have on the natural and social environments; as well as identifying potential opportunities and constraints the natural and social environment may pose to the Project.



The steps followed as part of this EA process, are (i) registration of application for an ECC, and (ii) execution of a scoping assessment (content of this report). A flowchart indicating the process being followed is presented by Figure 1.5 below.

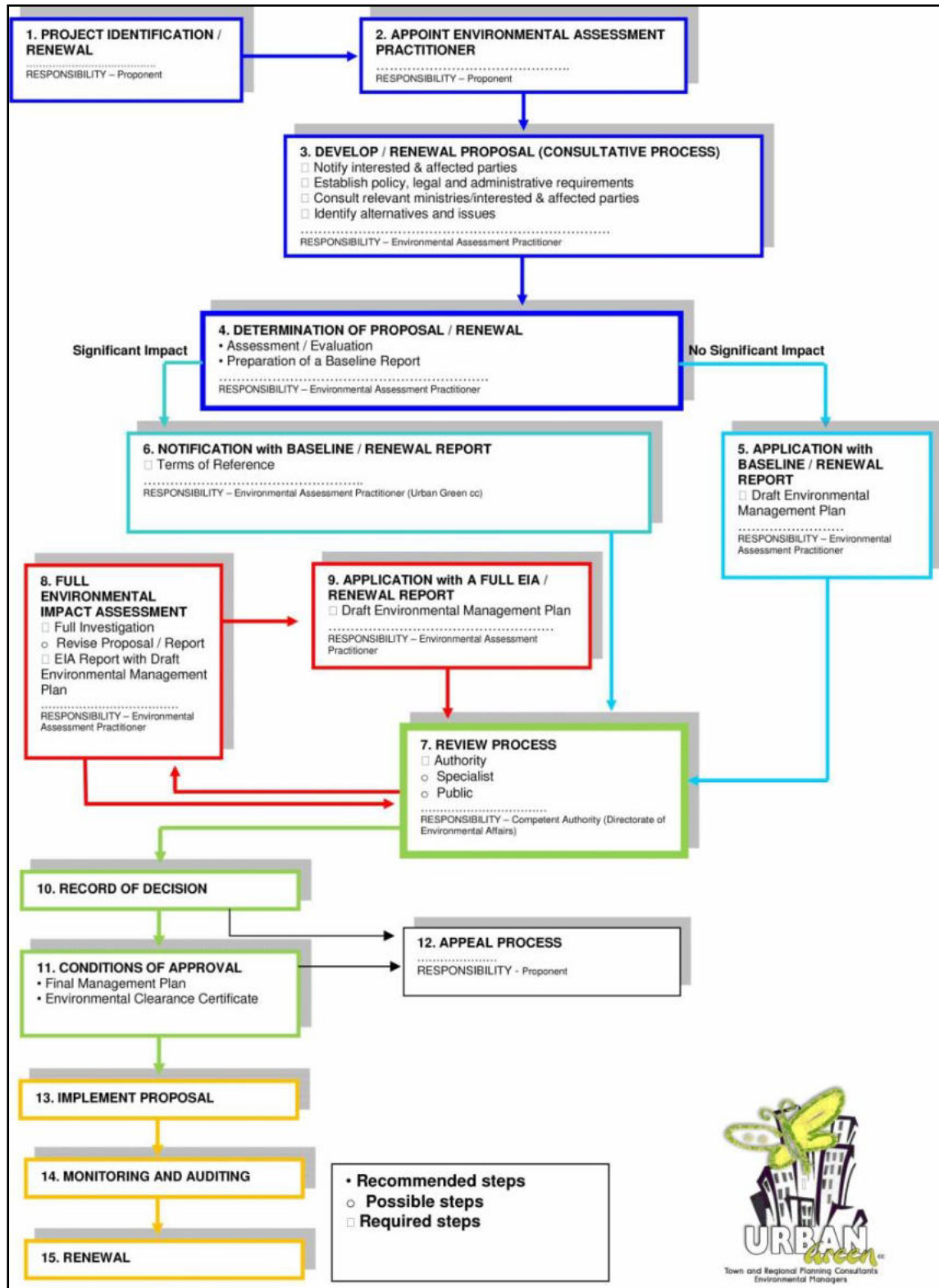


Figure 1.5-1: Diagrammatic representation of Namibia's Environmental Assessment process

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### 1.5.1 Registration of Application for ECC

The first step followed as part of this EA process was to identify the listed activities potentially associated with the Project, as stipulated in the '*List of Activities that may not be undertaken without an Environmental Clearance Certificate*' (GN. No. 29 of 2012) and register the mentioned with the Office of the Environmental Commissioner.

The listed activities for which an ECC is required are:

*“WATER RESOURCE DEVELOPMENTS”*

*The construction of facilities for -*

- 8.1 The abstraction of ground or surface water for industrial or commercial purposes.*
- 8.2 The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources.*
- 8.7 Irrigation schemes for agriculture excluding domestic irrigation.*

In accordance with Section 32 of the EMA, applications for an ECC should be submitted with the relevant Competent Authority, which for this Project was identified to be the Ministry of Environment, Forestry and Tourism and the Ministry of Agriculture, Water and Land Reform. The Ministry of Agriculture, Water and Land Reform was informed in writing on 27 September 2022 of the proponent's intention to apply for an ECC with the Environmental Commissioner, with a copy of the application submitted with the office of the Environmental Commissioner with the Ministry of Environment, Forestry and Tourism (Appendix A).

### 1.5.2 Scoping Stage Aims

The next step followed as part of this EA process was the scoping assessment. The identification of potential impacts and their significance, as well as public consultation (as prescribed by Regulation 21 to 24 of the EIA Regulations (GN. No. 30 of 2012) are important elements of the scoping stage. Hence, during the scoping stage issues/impacts that are likely to be significant are identified and those that are less significant are evaluated and if warranted, eliminated.

This stage, which began during September 2022 and is currently still underway, set out to -

- Collect baseline information and professional/public opinion with regards to the project and the receiving environment (i.e. social and biophysical environments);
- Determine the manner in which and to what extent the project may affect the biophysical and social environments;
- Establish the need and desirability of the project;
- Compare advantages and disadvantages of feasible alternatives;
- Highlight the potential significant effects that are likely to be of most importance and to develop or recommend mitigation measures; and

- 
- Advise on any further studies to be conducted (if any) and provide appropriate Terms of Reference for these.

### **1.5.3 Scoping Stage Method**

The method followed during the scoping stage was as per the requirements set by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), which included –

- Giving notice to all potential interested and affected parties (I&APs) of the application (ECC application);
- Public consultation as per Regulation 21 which included the -
  - Opening and maintaining a register of all I&APs;
  - Receiving and recording of all comments and representations received from I&APs following the public consultation processes;
- Preparing a scoping report by subjecting the proposed application to scoping by -
  - Assessing the potential effects of the proposed listed activities on the environment (specialist studies also formed part of this stage);
  - Assessing whether and to what extent the potential effects identified can be mitigated and whether there are any significant issues and effects that require further investigation;
  - Identifying feasible alternatives related to the project;
  - Setting the Terms of Reference for further investigations (if required);
  - Informing I&APs of the way forward in the EA process;
  - Ensuring informed, transparent and accountable decision-making by the relevant authorities; and
  - Inviting all registered I&APs to comment on the scoping report.
- Informing all registered I&APs of the decision of the office of the Environmental Commissioner.

### **1.5.4 Specialist Studies**

Given the nature of the activities associated with the increase water abstraction and the sensitivity of the receiving environment, a Geohydrology Baseline Assessment (attached as Appendix D) and an Ecological Baseline Assessment (see Chapter 5 and Appendix E) were conducted.

### **1.5.5 Issues and Concerns Raised, Identified and Assessed**

Some of the typical environmental issues pertaining to irrigated agricultural development and increased groundwater abstraction include:

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- 
- watershed degradation;
  - encroachment of unique ecosystems and historical /cultural sites;
  - biodiversity loss/change;
  - proliferation of invertebrate and vertebrate pests and disease carriers;
  - soil erosion;
  - soil fertility;
  - sedimentation;
  - surface and groundwater water hydrology (level, quantity, quality);
  - seepage;
  - waterlogging; and
  - eutrophication.

During the screening stage, the following issues for further investigation was identified for this Project:

- Water usage and decline in ground water levels of the Stampriet Artesian Basin;
- Groundwater pollution;
- Loss of biodiversity;
- Soil degradation; and
- Dust pollution.

Issues raised during the 1<sup>st</sup> round of public consultation that was undertaken from 27 September to 18 October 2022 (Refer to Chapter 6 and Appendix F) are -

- Concerns were raised regarding the impact that the substantial increase in groundwater abstraction from 42 000 m<sup>3</sup> to 430 000m<sup>3</sup> might have on the SAB water levels, livelihoods and ecosystems downstream of the Project Site;
- It was suggested that a cautious approach be undertaken whereby a gradual and monitored increase in groundwater abstraction be undertaken to the maximum of the standard quota of 199 000 m<sup>3</sup> of the area;
- It was further suggested that the orchard development and it's increase in groundwater abstraction be undertaken in a phased approach to determine the impact and its extend;
- Concern regarding groundwater pollution was further raised with reference to the impact it might have on water quality downstream of the Project especially on the Gochas Water Supply Scheme of NamWater.

The Geohydrological Baseline Assessment (attached as Appendix D) and the Ecological Baseline Assessment (see Chapter 5 and Appendix E) were carried out as part of the scoping stage and these confirmed and highlighted the following issues –

- Possible reduction of groundwater availability due to over-abstraction;
- Possible pollution of the groundwater resources;

- 
- Loss of Biodiversity and Habitat Destruction; and
  - Soil degradation.

Other issues identified as part of the scoping assessment are -

- Positive Impact on food security;
- Positive Impact on job creation for Witkrans, Stampriet and Gochas communities.

These issues are discussed in detail in Chapter 7 of this report and mitigation measures and recommendations are provided.

## **1.6 PURPOSE OF THIS FINAL SCOPING REPORT**

This Final Scoping Report (FSR) has been compiled as part of an assessment that has been undertaken for an increase in groundwater abstraction from the Stampriet Artesian Basin (SAB) on the Remainder of Farm Sponholz No. 140. 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) during both consultation opportunities. It further provides an assessment of the impacts of the proposed project along with mitigation measures and recommendations.

The Draft version of this Report was made available for public review and comment from 13 to 28 March 2023, as required by section 23 of the Environmental Impact Assessment Regulations (GN. No. 30 of 2012). Comments received were included into this FSR submitted with the Ministry of Agriculture, Water and Land Reform (i.e. Competent Authority) and the Ministry of Environment, Forestry and Tourism, Directorate of Environmental Affairs (i.e. Approving Authority) with for decision-making.

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.

## **1.7 STUDY ASSUMPTIONS AND LIMITATIONS**

In undertaking the EA and compiling the scoping report, the following assumptions and limitations apply:

- It is assumed that all the information provided by the proponent, appointed consultants and authorities consulted, is accurate and that those aforementioned have disclosed all necessary information available;
- It is assumed that all permit or licence requirements, other than the ECC, associated with the Project will be addressed as separate investigations and are not included in this EA process;
- It is assumed that there will be no significant changes to the project (see Chapter 4) or the affected environment (see Chapter 5) between the compilation of this report

and implementation of the project that could substantially influence findings, recommendations with respect to mitigation and management, etc.;

- The EA process 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
- The assessment is based on the prevailing environmental (social and biophysical) and legislative context at the time of writing this report.

## 1.8 STRUCTURE OF THE REPORT

This report consists of nine chapters as outlined below.

**Table 1.8-1 – Structure of the Report**

SECTION	CONTENTS
Executive Summary	<b>Executive Summary</b> Provides an overview of the main findings of the Study.
Chapter 1	<b>Introduction to the Project and this Report</b> Provides a background and motivation to the proposed development; Terms of Reference; Study approach and methods; the study assumptions and limitations; outlines the purpose, goals and structure of the Report. It also describes the procedure for submitting comment on the Study.
Chapter 2	<b>Project Team and Expertise</b> Provides an overview of the role-players participating in the project as well as their experiences.
Chapter 3	<b>Legislation Applicable to the EA &amp; Project</b> Provides an overview of the key legislation having relevance to the environmental assessment and activities associated with the proposed project.
Chapter 4	<b>Description of the Proposed Project</b> Provides a description of background to the proposed project and the physical appearance of the project, the technology intended to be used, service infrastructure and operation activities. It also mentions alternative options considered during the planning of the project and lists the socio-economic benefits that can be expected.
Chapter 5	<b>The Affected Environment</b> Describes the details pertaining to the site, the existing physical, biophysical, land use and socio-economic environment of the study area.
Chapter 6	<b>Details of the Public Participation Process</b> 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.

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Chapter 7	<b>Assessment of Potential Impacts</b> Describes and assesses the potential impacts of the proposed project. Mitigation measures relevant to the increased abstraction as appropriate are recommended.
Chapter 8	<b>Conclusions and Recommendations</b> Provides conclusions to the impact assessment and evaluates the overall suitability of the proposed expansion. Recommendations for implementation are also provided, as appropriate.
Chapter 9	<b>References</b> Provides information on the information referenced in the document.

## 2 PROJECT TEAM

This chapter of the report provides an introduction and overview of the various role players on this Project, as well as the expertise and qualifications of the environmental consultants and specialists.

### 2.1 ROLE PLAYERS

The role players in this project are set out in Table 2.1-1 below.

**Table 2.1-1** - *The role players*

ORGANISATION	PROJECT ROLE
Ministry of Agriculture, Water and Land Reform	Competent Authority
Ministry of Environment, Forestry and Tourism	Authorising Authority
Directorate of Environmental Affairs	Decision-making authority for environmental authorization
BV Investments 265 CC	Proponent
Urban Green cc – Brand van Zyl	Independent Environmental Consultant (EAP)
Christina Tromp	Independent Environmental Consultant (EAP) and Ecologist
Otto van Vuuren	Geohydrologist

#### 2.1.1 Proponent

The Proponent is BV Investments 265 CC who is the current owner of the Remainder of Farm Sponholz No. 140 and who will be responsible for the irrigation expansion development following increase groundwater abstraction.

#### 2.1.2 Environmental Assessment Practitioner

Urban Green Consultants cc is a multi-disciplinary consultancy, which has been offering innovative and environmentally sound solutions for over 18 years to private-, public- and NGO clients in Namibia. They offer professional services in Environmental Management, and Town and Regional Planning, as well as advise and products in the water and wastewater treatment industry. Urban Green compiled the following project team for the EIA as introduced in Section 2.2 below.

## 2.2 EXPERTISE OF THE EAP AND EIA SPECIALISTS

The qualifications and expertise of the environmental consultants and specialists are set out in Table 2.2-1 below and CV's appear in Appendix B.



**Table 2.2-1 – Qualifications and expertise of the environmental consultants**

<b>NAME</b>	<b>Mr Brand van Zyl</b>
RESPONSIBILITY ON THE PROJECT	EAP Public consultation, impact assessment and mitigation formulation, reporting and application for Environmental Clearance
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	18
EXPERIENCE	Brand van Zyl has been involved in various Environmental Impact Assessment studies throughout Namibia and of different kind.
<b>NAME</b>	<b>Christina Tromp</b>
RESPONSIBILITY ON THE PROJECT	EAP / Ecologist Study of the affected environment, impact assessment and mitigation formulation, reporting and application for Environmental Clearance
QUALIFICATIONS	M. Phil Degree in Environmental Management and Bachelor of Science Degree in Agriculture, majoring in Nature Conservation
PROFESSIONAL REGISTRATION	Environmental Assessment Professional Association of Namibia (EAPAN)
EXPERIENCE IN YEARS	14
EXPERIENCE	Christina Tromp is an educated environmentalist with work experience in the Namibian environment in Rural Development, Agricultural and Environmental sectors. She is a registered Environmental Assessment Practitioner. Her work experience was gathered in most regions of Namibia.
<b>NAME</b>	<b>Mr Otto van Vuuren</b>
RESPONSIBILITY ON THE PROJECT	Assessing the pumping test report by NamWater for the geohydrological input into the Environmental Impact Assessment
QUALIFICATIONS	B. Sc (Geological sciences); B.Sc (Hons) (Hydrology and Geohydrology)
PROFESSIONAL REGISTRATION	Awaiting registration as Senior Geoscientist at the Geosciences Council of Namibia. (Application submitted)
EXPERIENCE IN YEARS	36
EXPERIENCE	Otto van Vuuren has more than 30 years' experience in the groundwater sector and related services in Namibia.

### 3 LEGISLATION APPLICABLE TO STUDY AND PROPOSED PROJECT

For environmental protection and sustainable renewable resource management to the benefit of all, legislation from different spheres under control of different ministries have been adopted and enacted by Parliament. In support to the goal of sustainable renewable resource management, various international treaties and conventions have also been agreed to by Namibia.

There are several sectoral laws that fall under the general rubric of environmental laws. Sectoral laws are generally specific and apply to sectors such as water, agriculture, mining, forestry and so forth. Any development, such as this, is expected to have certain impacts and would therefore have to comply with some or other legislative requirement/s before commencement.

This chapter provides an overview to the legislation that is applicable to both the assessment process and the various activities making up the irrigation expansion development. It is accordingly divided into: (i) the legal framework for environmental management in Namibia; (ii) national sectoral legislative requirements applicable to the activities of the project; and (iii) international treaties and conventions and (iv) other relevant agreements and approvals required for the commencement of the project.

#### 3.1 NAMIBIAN LEGAL FRAMEWORK FOR EIA

Several Namibian legislation and policies have environmental considerations with respect to the proposed Project.

The instruments accounting for the legal framework for conducting an environmental assessment is listed in Table 3.1-1 below.

**Table 3.1-1 – Namibian legislation applicable to the EA process**

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
<b>ENVIRONMENTAL ASSESSMENT LEGAL FRAMEWORK</b>		
The Namibian Constitution (1990)	Article 95 (1) states that “ <i>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</i> ”	The Project should support the provisions of the Namibian Constitution

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	<p><i>on a sustainable basis”</i></p> <p>Article 100 stipulates that all natural resources are vested in the state, unless otherwise legally owned. The use of such resources is only allowed within reasonable limits and beyond such limits, permission should be obtained from a competent authority responsible for the use and governance of the concerned natural resources.</p>	
Environmental Management Act (No 7 of 2007)	<p>Section 3(2) of the EMA provides a set of principles that give effect to the provisions of the Namibian Constitution for integrated environmental management.</p> <p>Section 27(3) stipulates that no party, whether private or governmental, can conduct a listed activity without an ECC obtained from the Environmental Commissioner.</p> <p>Section 40(1) stipulates that an ECC remains valid for a period not exceeding three years, subject to cancellation or suspension.</p>	<p>The Project should adhere to the principles provided in the EMA.</p> <p>An ECC should be obtained for the Project.</p> <p>The Proponent should renew the ECC (if granted) every three years.</p>
EIA Regulations 2012 (GG No. 4878 GN No. 29 and 30)	<p>Provides for the process to be followed in undertaking an environmental assessment, stipulating particular requirements with regards to public consultation, the identification of impacts and establishing the significance thereof, as well as the content of an environmental scoping report.</p> <p>Of particular interest is the transfer of an ECC, which is regulated by section 20 of the EIA Regulations.</p>	<p>The EA process should be undertaken as prescribed in the EIA Regulations.</p> <p>Transfer of the ECC should be done as per the requirements, at the time when so required.</p>

### 3.2 NAMIBIAN SECTORAL LEGISLATIVE REQUIREMENTS

A number of Namibian legislation and policies have environmental considerations in respect of the proposed Project, as listed in Table 3.2-1 below.

**Table 3.2-1 - Cross-sectoral legislation applicable to the project**

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
<b>NATIONAL SECTORAL LEGISLATION</b>		
Water Act, Act 54 of 1956	<p>Main purpose is to provide for the sustainable development and use of water resources. Makes provision for a number of functions pertaining to the management, control and use of water resources, water supply and the protection of water resources.</p> <p>A distinction is made between private and public water in terms of ownership, control and use.</p> <p>The Act prohibits the pollution of underground and surface water bodies.</p> <p>Liability of clean-up costs after closure / abandonment of an activity.</p>	The Proponent should ensure that water use are as sustainable as possible within the permissible limit and that no pollution of any above and/or below ground water resource takes place.
Water Resource Management Act No. 11 of 2013 (not effected as yet)	<p>The aim of the act is to provide for the management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters.</p> <p>The Act also regulates disposal of sewage, the purification standards of effluent, the prevention of surface and groundwater pollution, and the sustainable use of water resources.</p>	
Soil Conservation Act No. 76 of 1969, as amended	Prevention and combating of soil erosion; conservation, improvement and manner of use of soil and vegetation, and protection of water sources and provide for matter accidental thereto.	The proposed Project should follow agronomic best practices to adhere to and meet the requirements for soil conservation as set out in the Act.
Forest Act No. 12 of	Provision for the protection of various plant	The project site harbours

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
2001, as amended	<p>species. and of the environment.</p> <p>Prohibits the removal of and transport of various protected plant species.</p>	<p>endemic, endangered and/or protected species, such as Camelthorn (<i>Acacia erioloba</i>), and Shepherd's tree (<i>Boscia albitrunca</i>)</p> <p>Permits are required for the removal of these trees, bushes or shrubs, or any other indigenous plants. A list of plant species and their conservation status is listed in Appendix E.</p>
Nature Conservation Ordinance No. 4 of 1975, as amended	<p>Protects wild animals and indigenous plants.</p> <p>Prohibits disturbance or destruction of the eggs of huntable game birds or protected birds without a permit.</p> <p>Requires a permit for picking (the definition of "picking" includes damage or destroy) protected plants without a permit.</p> <p>Prohibits the removal of and transport of various protected plant species.</p>	<p>The project site may harbour some of the endemic, endangered and/or protected species as listed in Schedule 9 of the Ordinance.</p> <p>Permits are required for the removal of the listed species as indicated in Appendix E.</p>
National Heritage Act (Act 27 of 2004), as amended	<p>The Act requires the identification of cultural and archaeological sites within the study area, registration and protection thereof.</p> <p>Heritage sites or remains are defined in Part 1, as "any remains of human habitation or occupation that are 50 or more years old found on or beneath the surface".</p> <p>Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the</p>	<p>All protected heritage resources (e.g. human remains etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.</p>

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	National Heritage Council.	
Agronomic Industry Act No. 20 of 1982	Marketing of cereals in the country is regulated by this Act.	The Proponent must be aware of this Act and adhere to the stipulations if/where relevant.
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act No. 36 of 1947	The Act provide for the appointment of a Registrar of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies; for the registration of fertilizers, farm feeds, agricultural remedies and stock remedies; to regulate or prohibit the importation, sale, acquisition, disposal or use of fertilizers, farm feeds, agricultural remedies and stock remedies; to provide for the designation of technical advisers and analysts; and to provide for matters incidental thereto.	The Proponent must be aware of this Act and adhere to the stipulations if/where relevant for the use of fertilizers.
Hazardous Substances Ordinance No. 14 of 1974, as amended	This ordinance provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances. It is administered by the Ministry of Health and Social Services.	Any hazardous waste needs to be handled, stored, and disposed of in a responsible manner and at appropriate waste sites.
Atmospheric Pollution Prevention Ordinance No 11 of 1976, as amended	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.	Excessive dust emissions caused during operations should be avoided or mitigated as it could be categorised as causing a public nuisance under common law.
Public Health Act No. 36 of 1919, as amended	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied	The Proponent should consider and ensure proper human health and safety

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
Health and Safety Regulations GN 156/1997 (GG 1617)	by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	conditions.
Labour Act No. 11 of 2007, as amended	<p>The Labour Act (No. 6 of 1992), the New Labour Act (no. 11 of 2007) and Government Notice 156 of 1997: Labour Act, 1992: Regulations Relating to the Health and Safety of Employees at Work, governs working conditions of employees.</p> <p>These regulations are prescribed for among others safety relating to hazardous substances, exposure limits and physical hazards. Special consideration must be given to:</p> <ul style="list-style-type: none"> <li>• Chapter 3: Welfare and Facilities at Work-Places</li> <li>• Chapter 4: Safety of Machinery</li> <li>• Chapter 5: Hazardous Substances</li> <li>• Chapter 6: Physical Hazards and general provision</li> </ul>	<p>The cultivation activities involve the operation of heavy machinery. The Proponent needs to comply with health and safety regulations during these operations.</p> <p>Operational activities should also not result in any potential negative health implications to the labourers and/or larger community.</p>

While it has been set out to list all those laws and regulations, which regulate the healthy functioning of the environment, it is not necessarily complete and the proponent has the responsibility to make themselves aware of all applicable legislation and permit requirements applicable to the Project.

### 3.3 INTERNATIONAL TREATIES AND CONVENTIONS

The international treaties and conventions applicable to the Project and worth taking note of are listed below in Table 3.3-1 below.

**Table 3.3-1** - International Treaties and Conventions applicable

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the	Removal of vegetation cover and destruction of natural

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	<p>conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use.</p> <p>Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.</p>	<p>habitats should be avoided and where not possible minimised.</p>
<p>The United Nations Convention to Combat Desertification 1994</p>	<p>Focuses on land degradation in the dry lands where some of the most vulnerable ecosystems and people in the world exist.</p>	<p>The Project should adhere to land management, which contributes to the conservation and sustainable use of biodiversity and the mitigation of climate change.</p>
<p>Stockholm Declaration on the Human Environment 1972</p>	<p>Recognises the need for: <i>“a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment”</i>.</p>	<p>The proponent should strive to protection of natural resources and prevention of any form of pollution.</p>
<p>National Policy on Climate Change for Namibia 2011</p>	<p>Seeks to promote the primary government objectives, which include job creation, provision of basic services and infrastructure development, alleviation of poverty and provision of housing. These priorities are generally compatible with the principles of sustainable development.</p>	<p>Climate Change Adaptation measures should be implemented as stipulated in the community information toolkit on adaptation for Erongo, Hardap, Karas and Khomas Regions (<i>MET 2011</i>)</p>
<p>United Nations Convention on the law of non-Navigational Uses of International Watercourses and the Protocol on Shared Watercourses</p>	<p>This Protocol defines watercourses in accordance with the UN Convention on Use of International Watercourses, which are defined in that Convention as systems in which surface and ground waters flow into a common terminus. The SADC Protocol lays down principles for the coordinated, cooperative and equitable use of water by riparian countries. It takes issues of social development and</p>	<p>Namibia, Botswana and South Africa are members of the SADC and are riparian countries of the SAB. They are therefore committed to support the SADC Protocol on Shared Water Resources (a revised version of which came into force in 2003). Given the importance of</p>



STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	environmental protection into account, and mandates an exchange of information among the riparian states about plans and projects pertaining to shared water resources. The SADC protocol provides for the development of joint management mechanisms (e.g. at the river basin level) and supports the IWRM concept, which implicitly includes groundwater.	transboundary aquifers in the SADC region, experts have called for an SADC agreement that specifically focuses on groundwater. To this end, accurate groundwater maps, groundwater classification in terms of hydrogeological characteristics and future demands, and adequate management regimes are deemed necessary

### 3.4 PERMITS, LICENCES, APPROVALS AND/OR AGREEMENTS REQUIRED

The following agreements/permits and/or licenses (Table 3.4-1) should be concluded/obtained prior to construction.

**Table 3.4-1** – *Permits, licences, approvals and/or agreements that may also be required.*

Activity	Type of Permit / Licence	Legislation / Institute
Environmental Clearance Certificate (ECC) for increased groundwater abstraction.	Environmental Impact Assessment in progress	Ministry of Environment, Forestry and Tourism
Valid permits for abstraction of groundwater for all operational boreholes	Application process awaits the ECC	Ministry of Agriculture, Water and Land Reform
Removal of protected and indigenous species	Permit if required	Ministry of Environment, Forestry and Tourism
Electricity supply	Contract and connection already exist.	NamPower

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## 4 DESCRIPTION OF THE PROPOSED ORCHARD DEVELOPMENT

This chapter provides a description of the proposed orchard development (the Project) which requires an increase in groundwater abstraction. It describes the details pertaining to the Project Site's locality, existing farming and agronomic activities as well as infrastructure. It also describes the envisaged increase in water abstraction.

The description has been compiled based on primary information obtained from the Proponent, a site visit, Geohydrological study, Ecological study as well as secondary information.

### 4.1 NATIONAL STRATEGIES & POLICIES

In the successive series of National Development Plans of Namibia, the Agriculture sector has been singled out as one of the priority sectors of the country. The sector is viewed to bring about much needed socio-economic development and improvement to the livelihoods of the majority of the Namibian people.

Namibian policy makers are, however, aware that water is a scarce and valuable resource. Therefore, an economic value is placed on water in order to include environmental externalities in the water costs and to encourage efficient and sustainable resource supply.

#### 4.1.1 National Water Policy White Paper

The National Water Policy provides a framework for equitable, efficient and sustainable water resources management. It provides for water services and stresses sectoral co-ordination, integrated planning and management as well as resource management aimed at coping with ecological and associated environmental risks. The policy makes it clear that water concerns extend beyond human needs for health and survival, but also recognises that water is essential to maintain natural ecosystems and that in a country as dry as Namibia, all social and economic activity depends on healthy aquatic ecosystems.

One of the strategies provided to ensure environmental and economic sustainability is to ensure that in-stream flows are adequate both in terms of quality and quantity to sustain the ecosystem. The policy proposes to protect water resources from pollution by enforcing the 'polluter pays principle' and regular water quality monitoring on all proposed projects. Principles contained in the policy, that are applicable to the Project, include:

*Ownership of water* – Namibia's limited and vulnerable water resources are an indivisible national asset, whose ownership is vested in the state on behalf of the whole society.

*Integrated management and planning* – Management and planning of water resources should be integrated across economic, environmental and social dimensions.

*Water for ecosystems* – Water resources management needs to harmonise human and environmental requirements and recognise the role of water in supporting ecosystems.

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*Recognition of economic value* – Economic value of water resources in Namibia should be recognised given their scarcity and vulnerability and that abstraction, management, conservation and use should be efficient and cost effective.

#### **4.1.2 The Namibia Agriculture Policy 2015**

According to the Namibia Agriculture Policy 2015, Agriculture is a very important sector in the Namibian economy as it continues to support the livelihoods and create employment for the majority of the population. The aims of the policy are largely economic and focus on increasing agricultural production, agro-processing and marketing as well as real farm income as a contribution to national household food security.

It further recognises the limitations imposed by the Namibian climate and soils and seeks to promote sustainable utilisation of the land and other natural resources within the context of a vulnerable ecosystem. As such, Agriculture activities should not be pursued at the expense of the environment and all stakeholders, that benefit from agriculture, are required to accept responsibility for sustainable management of natural resources.

#### **4.1.3 The Green Scheme Policy**

The Green Scheme Policy is an initiative conducted by the then Ministry of Agriculture, Water and Rural Development to encourage the development of irrigation based agronomic production in Namibia, with the aim of increasing the contribution of agriculture to the country's Gross Domestic Product (GDP) and to simultaneously achieve the social development and upliftment of communities located within suitable irrigation areas. The policy makes provision for several irrigation projects to be commenced in Namibia.

The implementation of this policy has, however, been marked by several obstacles, due to the fact that Namibia is one of the driest countries south of the Sahara. It now supports the implementation of conservation agriculture programmes. It emphasises environmental impact assessment requirements and water pricing methods.

#### **4.1.4 Institutional arrangements in Namibia**

The Department of Water Affairs and Forestry for Namibia (DWAF) within the Namibian Ministry of Agriculture, Water and Land Reform has a Geohydrology Division, which is responsible for all water resource development projects in the country, including irrigation planning and development.

Groundwater extraction in Namibia is controlled through a permit system. A licence has to be obtained before any drilling work may be carried out, and all boreholes have to be licensed for purposes of supervision.

In 1955, the existing laws governing use of artesian water were consolidated in the Water Ordinance No 35 of 1955, and the SAB was formally declared a Subterranean Water Control Area. The Ordinance also required that information about the actual quantity of water

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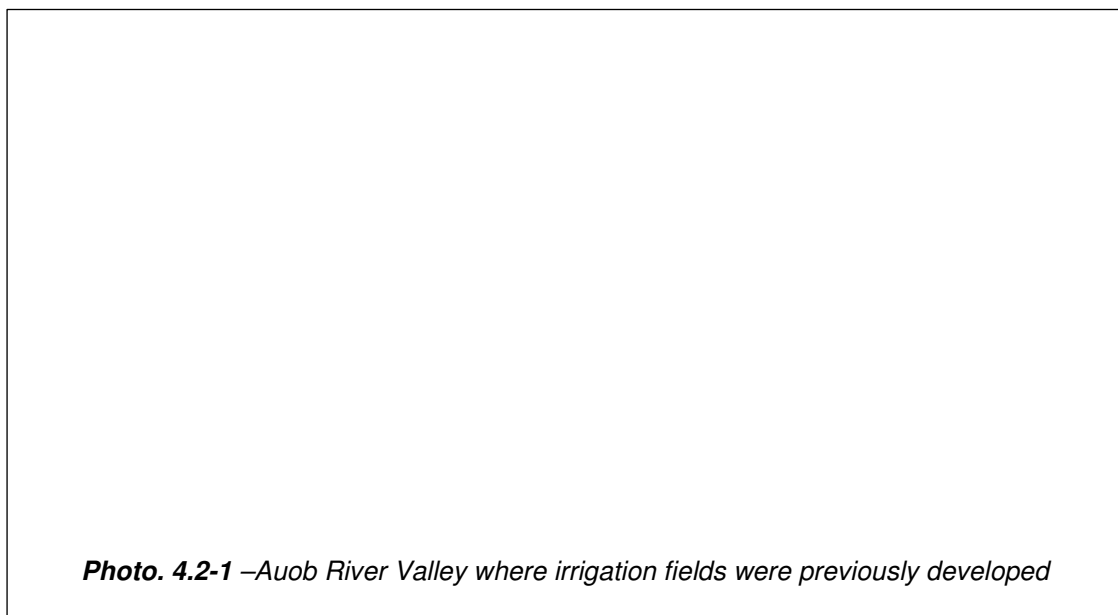
extracted must be provided by the permit holder. After the Articles of the South African Water Act (Act No 54 of 1956) were made applicable in Namibia, regulations were promulgated to monitor the sustainable use and management of artesian water sources, including those of the SAB (Alker, 2007).

At present, existing laws and regulations are enforced in the form of co-operation with water users. Groundwater management is controlled by means of both the permit system and the activities of local water user committees. User participation is institutionalized in Namibia through Basin Management Committees. These organizations are created for surface water basins. In view of concerns on the part of both local water users and the government about possible over-extraction of water in the SAB in Namibia, an aquifer management committee, the so-called Stampriet Basin Water Committee (SBWC), was formed to assist the Department of Water Affairs and Forestry in monitoring water utilization in the basin.

It is the intention that the Department will consult with the SBWC about new applications for water development, and the Committee should provide information about the extraction of water, the management of water resources, the illegal drilling of boreholes, leakage of boreholes, and any wasteful use of water. The Department must also monitor water levels and give technical advice to the drilling industry about the development of boreholes under artesian conditions. Aquifers in the SAB are persistently used where water occurrence and water quality are favourable.

## 4.2 EXISTING FARMING OPERATIONS

The Remainder of Farm Sponholz No 140 of 5 642 ha is predominantly used for livestock farming (sheep and cattle) and indigenous game grazing on natural vegetation. The previous owner developed 7 ha irrigation fields in the Auob River Valley next to the M33 road that were irrigated with sprinklers. High energy forage was cultivated here, such as lusern and sorghum. The current owner now uses 0.25 ha of these irrigation fields to produce sweet corn for own use. See Photo 4.2-1.



**Photo. 4.2-1** –Auob River Valley where irrigation fields were previously developed

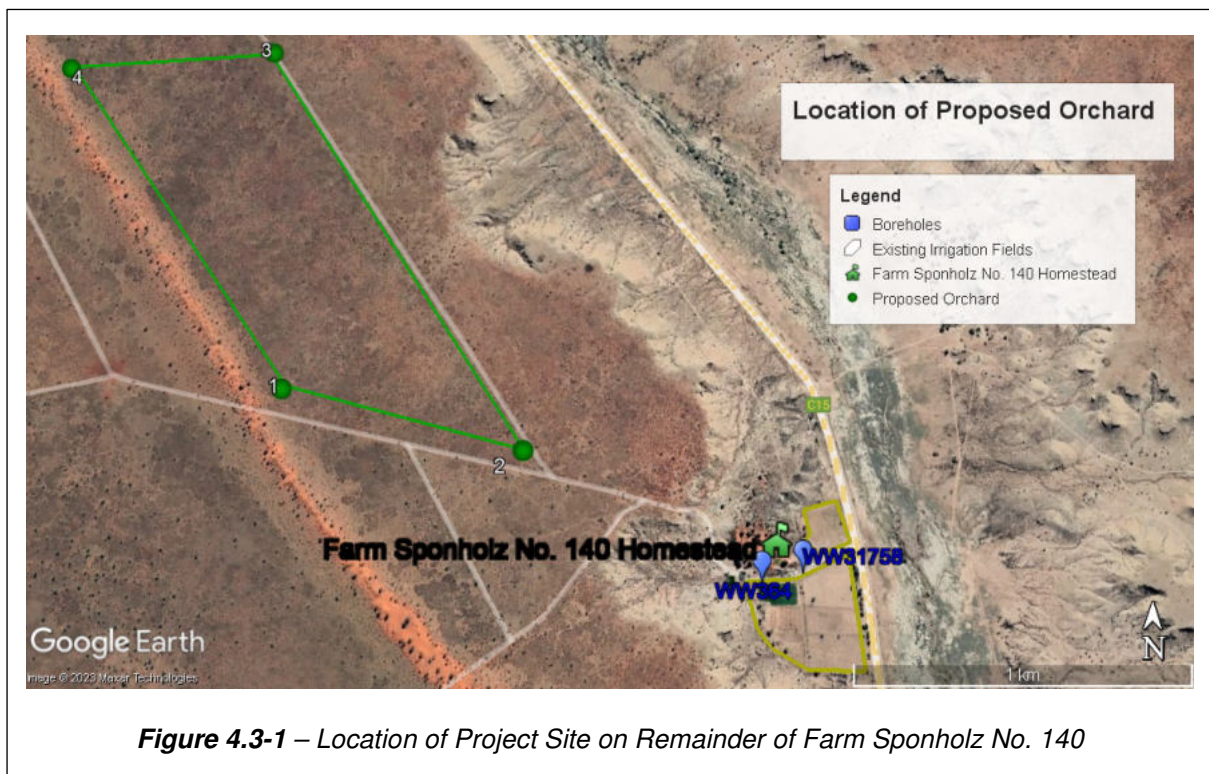
Water for irrigation purposes are sourced from two boreholes (WW364 and WW31758 on the north-eastern side of the Remainder of Farm Sponholz No. 140), that are registered with the MAWLR under Permit Number 10405. This permit for 42 000 m<sup>3</sup>/a expired on 7 May 2021 and an application for the renewal is awaited. Refer to Figure 4.3-1 below and Appendix D Geohydrology Baseline Report Fig 5, p.8 for the location of the boreholes.

### 4.3 PROJECT'S TECHNICAL DETAILS

#### 4.3.1 Project Overview

The development of the orchard is envisaged on top of the plateau that fringes the Auob River Valley on the flat area of the first inter-dune street. Refer to Fig. 4.3-1 for the location of the proposed orchard.

It is planned to develop the orchard in phases of 20 ha per year over a five-year period.



Irrigation by means of drip sprinklers will take place year round with decreased water supply only during the winter months when trees are dormant. For this, an increase to 430 000m<sup>3</sup>/a of groundwater is required from the two existing boreholes (WW364 and WW31758). Refer to Fig. 4.3-2 for a diagram of the site lay-out that indicates hectares and water requirements for the orchard.

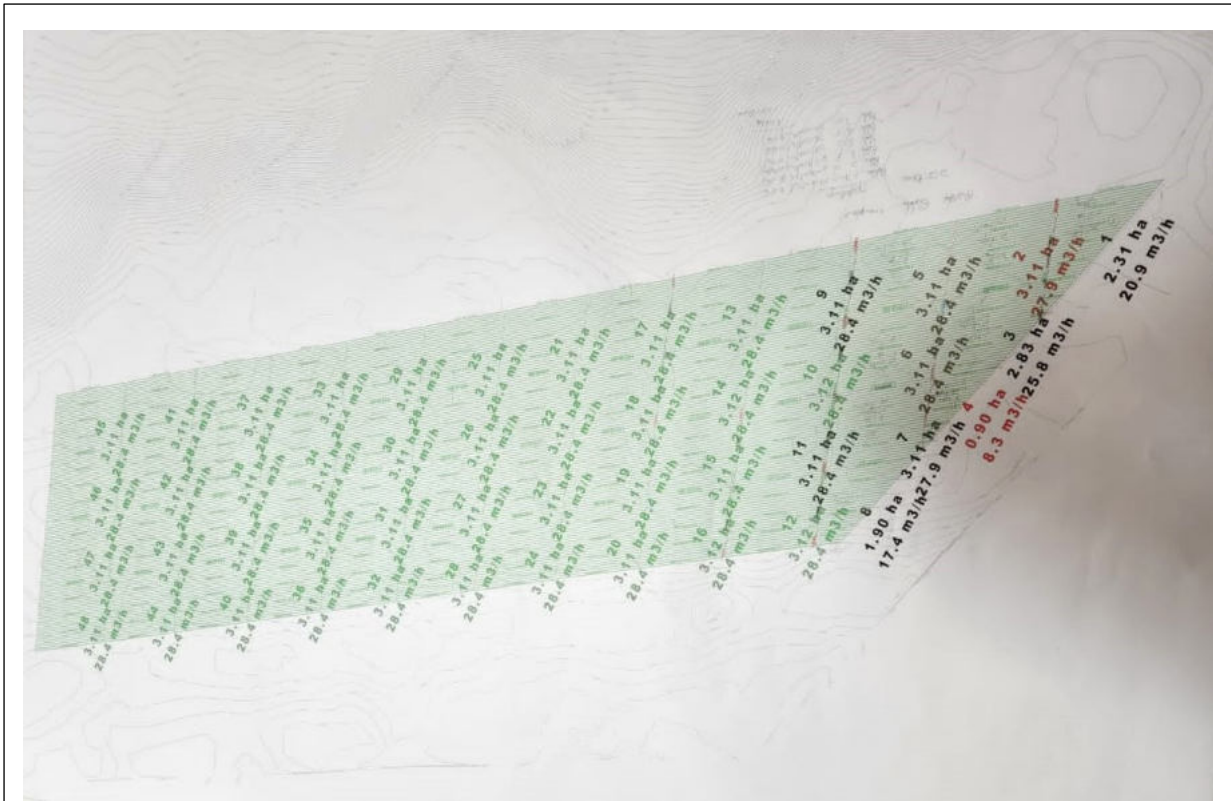


Figure 4.3-2 – Site Layout indicating hectares and water requirement

### 4.3.2 Supporting Infrastructure

#### (i) Roads & Access

The Remainder of Farm Sponholz No. 140 can be reached via the M33 gravel main road that runs between Stampriet and Gochas. The road passes through the eastern boundary of the farm. A gravel road give access to the homestead and current irrigation area.

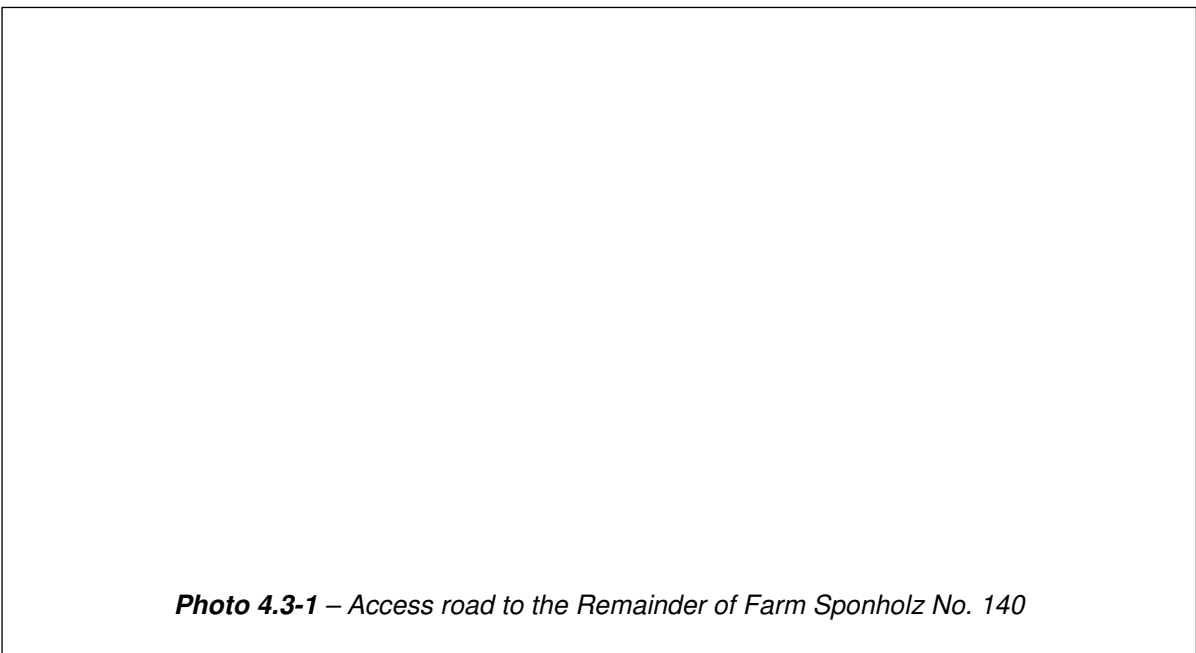


Photo 4.3-1 – Access road to the Remainder of Farm Sponholz No. 140

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Kalahari sand roads run between the homestead to the north-west where the orchard development is planned and west towards the rest of the farm. These are accessible with 4x4 vehicles, trucks and tractors.

**(ii) Electricity**

NamPower electricity is available on the farm. See Photo 4.3-2 below.



**Photo 4.3-2** – Electricity supply to farmhouse and neighbouring irrigation area

**(iii) Boreholes, Water Pumps and Pipelines**

Water is sourced from the SAB with submersible pumps through boreholes WW364 and WW31758. Refer to Figure 4.3-1 above and Fig. 5 of the Geohydrology Baseline Report, Appendix D for the location of boreholes on the Remainder of Farm Sponholz No. 140. The water is conveyed with a pipeline to a dam next to the homestead and current irrigation area. From here it will be pumped to the envisaged orchard.

The Geohydrology Baseline Study investigated the existing boreholes (WW364 and WW31758) and concern exist regarding the condition of these. Refer to and Geohydrology Baseline Report, Appendix D, p.7 – 9.

**(iv) Sprinklers/Drip irrigation**

The current 7 ha irrigation fields in the Auob Valley were developed with sprinklers.

It is envisaged that the orchards will be equipped with a drip irrigation system that must still be installed when development takes place.

A drip irrigation system distribute water through a network of valves, pipes, tubing and emitters. It is a preferred type of micro-irrigation that can save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil surface or buried below the surface (recommended for the arid conditions of the Project Site).



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**(v) Buildings**

The homestead consists of houses, warehouses, kraals and canopies. No further building construction is envisaged for the development of the olive and almond orchard.

**(vi) Processing equipment**

An oil press for olive processing and a shelling machine for almond processing will be required for processing of the produce.

### **4.3.3 Site Preparation Activities & Cultivation Methodology**

This section predicts activities associated with the development of olive and almond orchards and is presented below.

#### **4.3.3.1 Implementation of agronomic farm management technology**

New agronomic farm management technology (such as CropX) should be implemented right from the onset of irrigation development. These systems gather data on soil composition, soil moisture and climatic conditions to help farmers monitor the health of irrigation fields and crops and can prevent run-off water that might pollute groundwater.

#### **4.3.3.2 Soil Preparation**

In order to obtain guidelines for soil preparation, it is advised that soil samples be taken and analysed before planting. A soil analysis will determine the water-holding capacity, the nutrient content of the soil and how much fertiliser should be applied to ensure optimum production. Refer to Section 5.2.4 for a description of the soil of the Project area. Deep ripping will be required to break up the cement-like hardpan and tined tillage instruments will prevent and alleviate compaction.

A soil feeding programme will then be required, based on the soil contents and the developmental phases of the trees, to ensure they receive the right volumes of nutrients at the right time.

Almonds can grow in a wide range of soils and the ideal pH range for soil is 7 to 8.5. Almond trees are best suitable for fertile, loamy, deep and well-drained soils ([www.africabizplans.com](http://www.africabizplans.com)).

Olives require well-drained and well aerated soil. The soil should be prepared to a depth of at least 80 cm. For Olives the pH level of the soil should be above 5,0, preferably close to 6,0. Olives are more resistant to saline conditions in comparison to other fruit trees (DAFF, 2010).

#### **4.3.3.3 Fertilising**

Fertilisers are required, especially during the first three years after planting, to ensure the trees have access to enough macro- and microelements to get them into production earlier and for optimal production thereafter.

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It would be beneficial to apply organic mulches such as kraal manure, decomposed wood or sawdust, as it would:

- reduce water loss from the soil;
- protect the soil from compaction;
- protect the soil against extreme temperature changes;
- provide a habitat for earthworms;
- suppress weed growth.

#### **4.3.3.4 Planting**

Tree seedlings must be transplanted into prepared fields. Planting distances will depend on cultivar, soil fertility, level of orchard management, availability of water and the size of the orchard. Refer to Figure 4.3-2 above for a preliminary lay-out for the orchard.

Small transplanted trees must be supported by appropriate supporters to protect the trees from winds and to grow straight.

They will then grow within the natural ecosystem with weather elements like rainfall, temperature and sunlight as described in Section 5.2 playing a role in their growth.

#### **4.3.3.5 Watering**

Almond trees have relatively high nutrition and water requirements compared to other horticultural crops. Mature almond trees require about 1 200–1 500 mm of water per ha annually (i.e. 12 – 15 ML/ha) ([www.africabizplans.com](http://www.africabizplans.com)).

A young olive tree requires 15 to 20 litres of water per week during the first growing season. The volume and frequency of irrigation from the second year after planting and for mature olive trees will depend on the climate, season as well as tree size and age and is in the range of about 7 – 9 ML/ha water per annum (DAFF, 2010).

#### **4.3.3.6 Pruning and Weeding**

The trees must be pruned during the first two to three years after being planted. Thereafter the trees can maintain their own shape.

Weed control should start before planting and perennial weeds should be removed before soil preparation. Weed control should be done manually or mechanically through ploughing or disking on a regular basis rather than applying herbicides.

A strip of 1 m wide on both sides of the trees, within the planting row, should be cleared of weeds. The vegetation in the working row should remain, but should be kept short. The presence of natural vegetation in the working row has certain advantages. It will prevent soil compaction, reduce soil erosion, will enhance water infiltration and it harbours beneficial insects and other biological control agents which are necessary in the orchards.

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In an organic farming system, a relatively thick layer of mulch could be placed within the tree row. This mulch will assist in suppressing weed growth and it will also stimulate the trees to develop tiny, secondary roots, which is beneficial for nutrient uptake.

#### **4.3.3.7 Pest control**

Pests can be controlled primarily by their natural enemies as far as possible. Farmers should be careful not to disturb the delicate balance between predator and prey by the unnecessary use of pesticides. It could be unnecessary and hinder the opportunity to grow organically. Other orchard practices, such as pruning correctly and minimising the dust raised by orchard traffic, can reduce pest infestation.

#### **4.3.3.8 Harvesting**

Almond trees take an average of 5 years to begin fruiting and olive trees around 3 years.

Fruit maturation and harvesting dates will be influenced by the kind of cultivar, weather conditions and specific cultural practices. Fruit should be transported to the packing-shed as soon as possible after harvesting.

### **4.3.4 Operational Activities**

The activities associated with the operational phase are presented below.

- Day-to-day site checks, which include:
  - Daily rounds of the irrigation fields/orchards along existing tracks;
  - Inspect pump operation;
  - Check for leaks;
  - Inspection of cultivar and soil condition;
  - Signs of insects, pests or diseases;
  - Signs of damage by mammals and birds.
- Watering by means of drip irrigation, as described in Section 4.3.2 (iv).
- Fertilising through the drip irrigation system.
- Repair and Maintenance of drip irrigation:
  - Pre-season maintenance that involve checking the sprinklers and regulators and for system leaks;
  - Perform borehole maintenance (and rehabilitation or replacement if required), especially checking for damage caused by iron bacteria, clogging of screens;
  - Empty the sand trap;
  - Clear sprinkler blockages.
- Weeding and pest control (refer to Section 4.3.3.5 and 4.3.3.6)
- Harvesting.

- 
- Storage and/or transportation of produce off-site.

#### **4.3.5 Decommissioning**

Olive and almond farming is a long-term commitment. Orchards generally produce for 25 – 30 years, yielding their first crop approximately 3 - 5 years after planting.

It is the understanding that every Project should have a Project Life, after which rehabilitation to its natural pristine condition should take place. Decommissioning and rehabilitation will be the responsibility of the Proponent. It should be undertaken according to a Decommissioning & Rehabilitation Plan in consultation with a Botanist or Ecologist to advise on how to go about restoring the area to its pristine condition. It will involve:

- Lease or sale of farm buildings to prospective farmers; or
- Demolishing and removal of all temporary and permanent structures;
- Sale of equipment which are not obsolete;
- Disposal/sale of any scrap material;
- Appropriately dispose or level any unwanted heap of material left at the site;
- Preparation of disturbed areas;
- Search and relocate local indigenous vegetation onto the site;
- Rehabilitation to *Southern Kalahari* vegetation; and
- Rehabilitation monitoring.

The impacts expected to occur during increased water abstraction and orchard development, the assessment therefore and the mitigations recommended are discussed in more detail in Section 7.4, while the environmental requirements are listed in much detail within the Environmental Management Plan (EMP), attached in Appendix G.

## **4.4 ALTERNATIVES CONSIDERED**

### **4.4.1 Site Locality**

The sites for the orchard development were selected by taking into consideration topography, soil conditions and the availability of water sources (i.e. boreholes are the only source in this case).

The existing 7 ha irrigation fields are located in the more fertile soils of the Auob River Valley (see Fig. 4.3-1 in Section 4.3). The Project Site where the orchard development is envisaged, is towards the north-west of the homestead on the plateau in the flat area before the first longitudinal dune.

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The location of the orchard is in close proximity of the farm's existing boreholes and dam development. The distance for water pumping is thus minimum and it is close to the available infrastructure to make logistical arrangements easier.

#### 4.4.2 Water Source

Irrigation water will be sourced through the existing boreholes on the Remainder of Farm Sponholz No. 140 from the Stampriet Artesian Basin. The Auob River flows in a northwest-southeast direction on the north-eastern border of the farm, but flows only ephemerally. No other ground or surface water sources are available.

Rain fed irrigation is not sustainable in this part of the *Southern Kalahari*, due to the low and erratic rainfall conditions.

#### 4.4.3 Irrigation Method

It is envisaged that a drip irrigation system will be installed for the orchards. This is a type of micro-irrigation that has the potential to save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil or buried below the surface. Drip irrigation systems distribute water through a network of valves, pipes, tubing and emitters.

Some advantages of drip Irrigation that was taken into consideration are:

1. Maximum use of available water which improve infiltration in soil with less evaporation losses of water as compared to surface irrigation.
2. No water is available to weeds, which results in less weed growth and restricts population of potential hosts.
3. High efficiency in the use of fertilizers.
4. No soil erosion and no runoff of fertilizers into ground water.
5. Low labour and relatively low operation cost.
6. Maximum crop yield.
7. Decreased tillage operations.

#### 4.4.4 Crop Selection

For the production of high quality healthy oils, almond and olive trees were considered.

Almond trees are, however, best suited to Mediterranean climate, and have high water and nutrition requirements. Almonds can withstand a climate with hot summer temperatures ranging from 30 °C – 35 °C and cool winters for plant growth and kernel filling. Unopened blossoms can withstand cold up to – 2.2 C, but blossoms at petal fall stage can be damaged at 0.50 °C to – 1.1 °C. ([www.agrifarming.in/almond-farming-information](http://www.agrifarming.in/almond-farming-information) 2019)

Olives are more drought resistant and can withstand heat of 40 °C and cold up to - 5 °C. Olive trees are also less sensitive to wind damage and more resistant to saline conditions than other types of fruit. It can be grown on marginal soils, although growth and production

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will not be optimal then (DAFF, 2010). Olives are successfully produced in the Karoo with similar climate as Stampriet (*pers. comm. H.K. Rakaw*).

It was thus decided that development will start with 20 ha Olive trees, increasing in a phased process with 20 ha Olive trees per year for a five-year period to make it feasible. Almond trees will only be planted at this stage for experimental purposes to test the suitability of the cultivar (*pers. comm. H.K. Rakaw*).

#### **4.4.5 The No-Go Option**

The no-go alternative would be not to proceed with the proposed development of the orchard. The area will then remain in its current, pristine condition with natural vegetation that is adapted to the unique climatic conditions of the *Southern Kalahari* biome.

Sheep, goats, cattle and game are successfully farmed in the area in an extensive way. It is less labour intensive than agronomic farming and livestock breeds that are well-adapted to arid regions are well established in the area. Livestock and game are sold at auctions, directly to local buyers, hunters, abattoirs and butchers or on an ad hoc informal basis.

Proceeding with the orchard development will imply potential positive socio-economic benefits towards job creation and food security. Capital costs and running costs for irrigation farming are higher than livestock farming, but yield per ha is also higher. If proper mitigation measures regarding groundwater abstraction and pollution and soil deterioration will be implemented, environmental costs can be decreased to a sustainable level.

### **4.5 PROJECT BENEFITS**

#### **4.5.1 Socio-Economic**

##### ***4.5.1.1 Employment***

During the development phase the Project will provide full-time employment to 5 labourers and an additional 15 labourers will be temporarily required.

During the operational phase it is envisaged that 10 permanent workers will be employed with an additional 50 workers per day for 2 months of the year during harvesting.

This will bring job opportunities to the Witkrans, Stampriet and Gochas communities, where limited other economic activities take place.

##### ***4.5.1.2 Contribution to local Food Security***

The Project will contribute to Namibia's food security through increased production of olives and olive oil to the local Namibian market.

#### ***4.5.1.3 Contribution to Namibia's GDP***

The Project has the potential to contribute positively to the Namibian GDP by exporting excess produce to South Africa and the European Union.

## 5 THE AFFECTED ENVIRONMENT

This chapter describes the details pertaining to the larger study area's existing physical, biophysical and socio-economic environments, which defines the sensitivities to be considered for the expansion of irrigation and water abstraction.

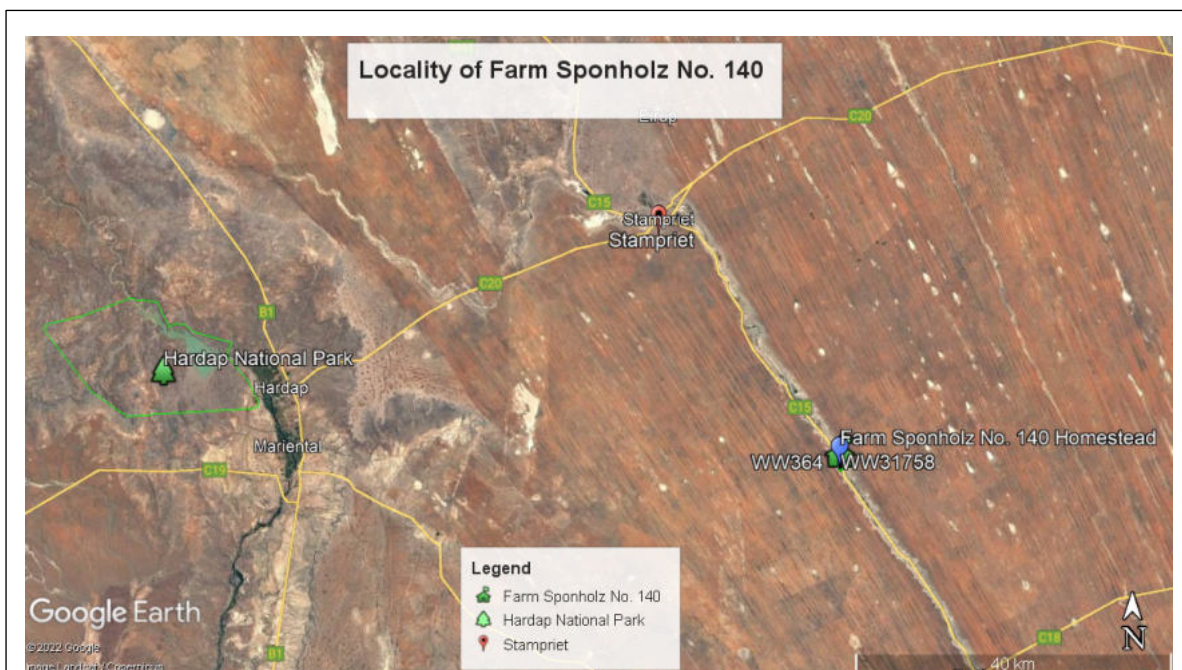
This chapter provides baseline information according to which the likely negative and positive impacts of increased irrigation farming will be assessed, as well as the significance thereof, which in turn will inform the applicable mitigating measures and need for any further detailed assessments.

A great deal of this chapter is derived from specialist input (i.e. Ecological as discussed in this section and Appendix E and Geohydrological Assessment attached as Appendix D).

### 5.1 LOCALITY

The Remainder of Farm Sponholz No. 140 is located approximately 30 km south, south-east of Stampriet in the *Southern Kalahari Biome* of Namibia. Refer to Fig. 1.2-1 in Section 1.2 for the locality.

The farm's north-eastern border lies within the Auob River. Towards the south-west the farm stretches over longitudinal sand dunes with linear inter-dune valleys that run in a north-west to south-east direction. The Project Site where the orchard development is envisaged, is on the plateau fringing the Auob River Valley in the flat area before the first longitudinal dune (refer to Fig. 4.3-1 in Section 4.3 and Fig. 5.1-1 below).



**Figure 5.1-1** Locality of the Remainder of Farm Sponholz No. 140 next to the Auob River

## 5.2 PHYSICAL ENVIRONMENT

The physical environment is typical of the *Southern Kalahari* biome found within the south-eastern parts of Namibia, which directly determines this particular bio-physical environment (refer to Section 5.3).

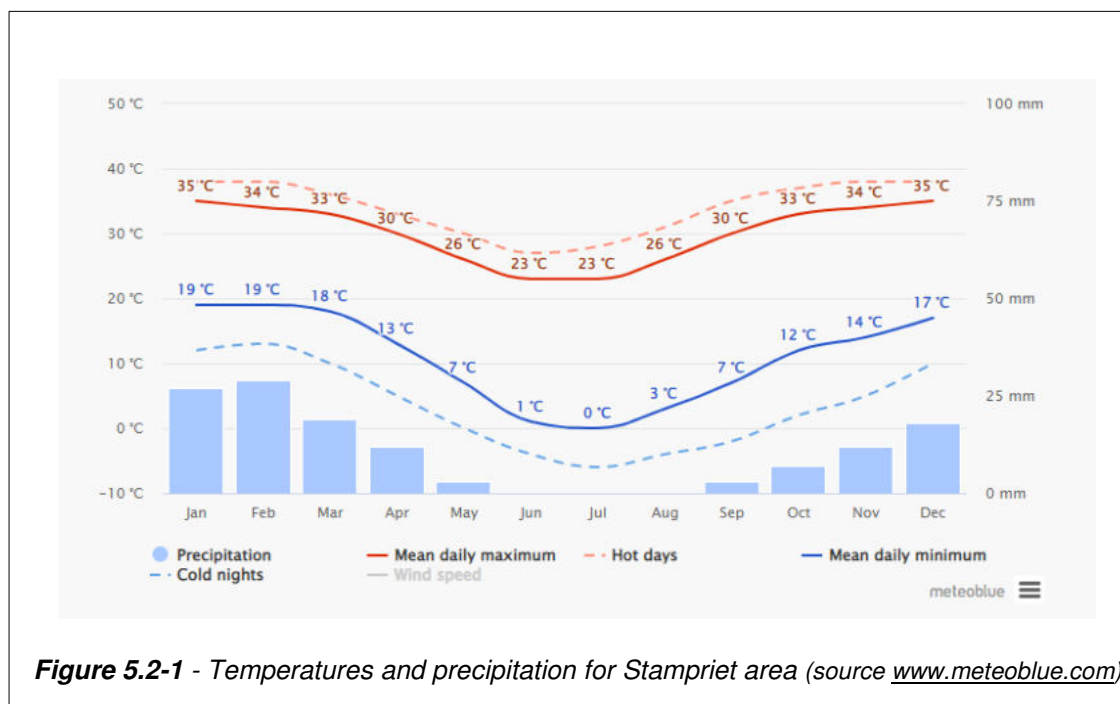
The proposed Project will by its nature impact on the project site's physical character and vice-versa, which again will affect the bio-physical environment.

### 5.2.1 Climate

#### 5.2.1.1 Temperature

The average maximum temperatures during the hottest months (December, January and February) range between 34-35 °C, while average lowest temperatures in winter (June, July and August) can go lower than 2 °C. Refer to Fig. 5.3 below.

The Project area is thus located in the coldest area of the country and frost is more frequent here.



#### 5.2.1.2 Precipitation

Average annual rainfall vary between 200 - 250 mm with rainfall highest in December, January, February and March (refer to Fig. 5.2-1). Average annual evaporation is estimated at 2 240 – 2 380 mm/year, which leaves a water deficit of approximately 2 100 – 2 300 mm per year (Mendelson et.al. 2002).



Humidity in the area can range from 10 – 20 % in the least humid months (October) to 60-70% in the rainy season.

### 5.2.1.3 Frost

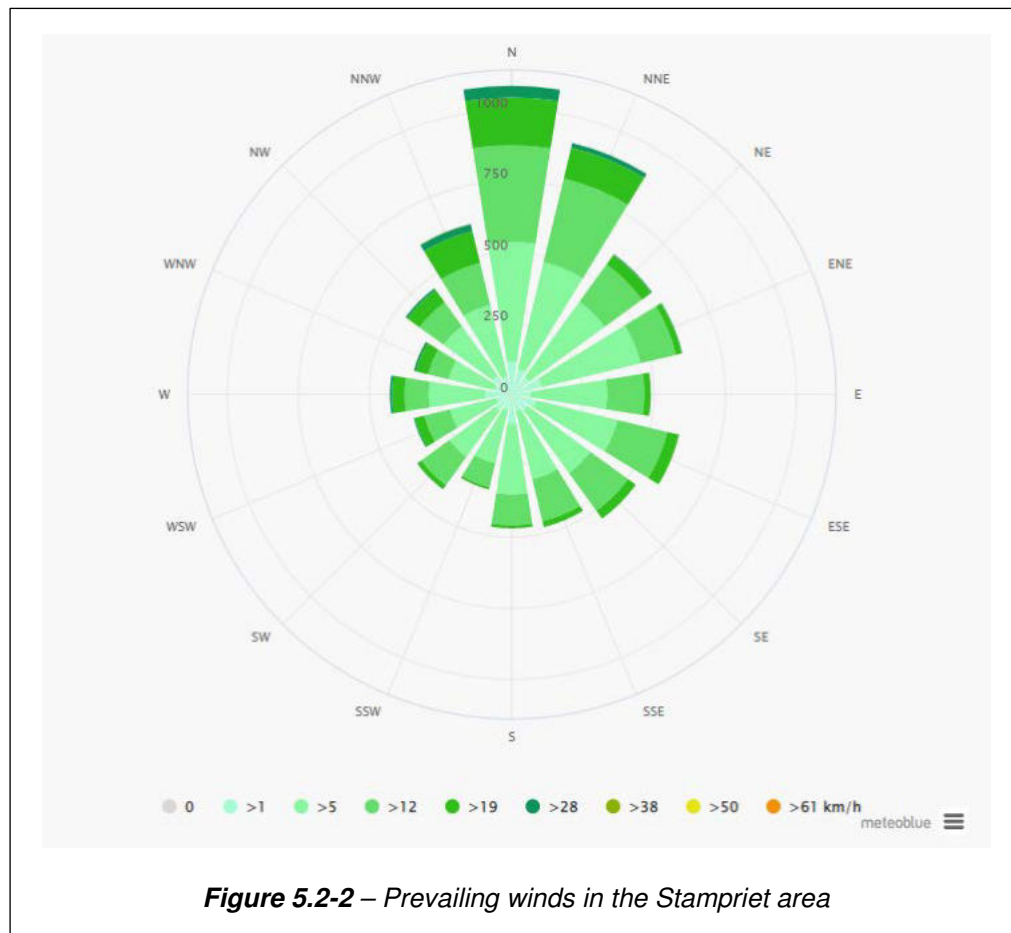
The Project area is prone to frost for 20 – 30 days of the year in winter. (*Mendelson et.al., 2002*).

### 5.2.1.4 Sunshine and Solar Radiation

The average hours of sunshine in the Stampriet area is approximately 10-11 hours per day and solar radiation is estimated at 6.0-6.2 kWh/m<sup>2</sup> per day (*Mendelson et.al. 2002*). Solar power can thus be harvested efficiently here.

### 5.2.1.5 Wind

The wind rose of Stampriet shows in Fig. 5.2-2 that wind is predominantly north and north, north-east, which correlates with the directions of the dune alignment in the area. The alignment of dunes reflects the direction of the prevailing winds when the dunes were formed.



**5.2.2 Geology and Hydrogeology**

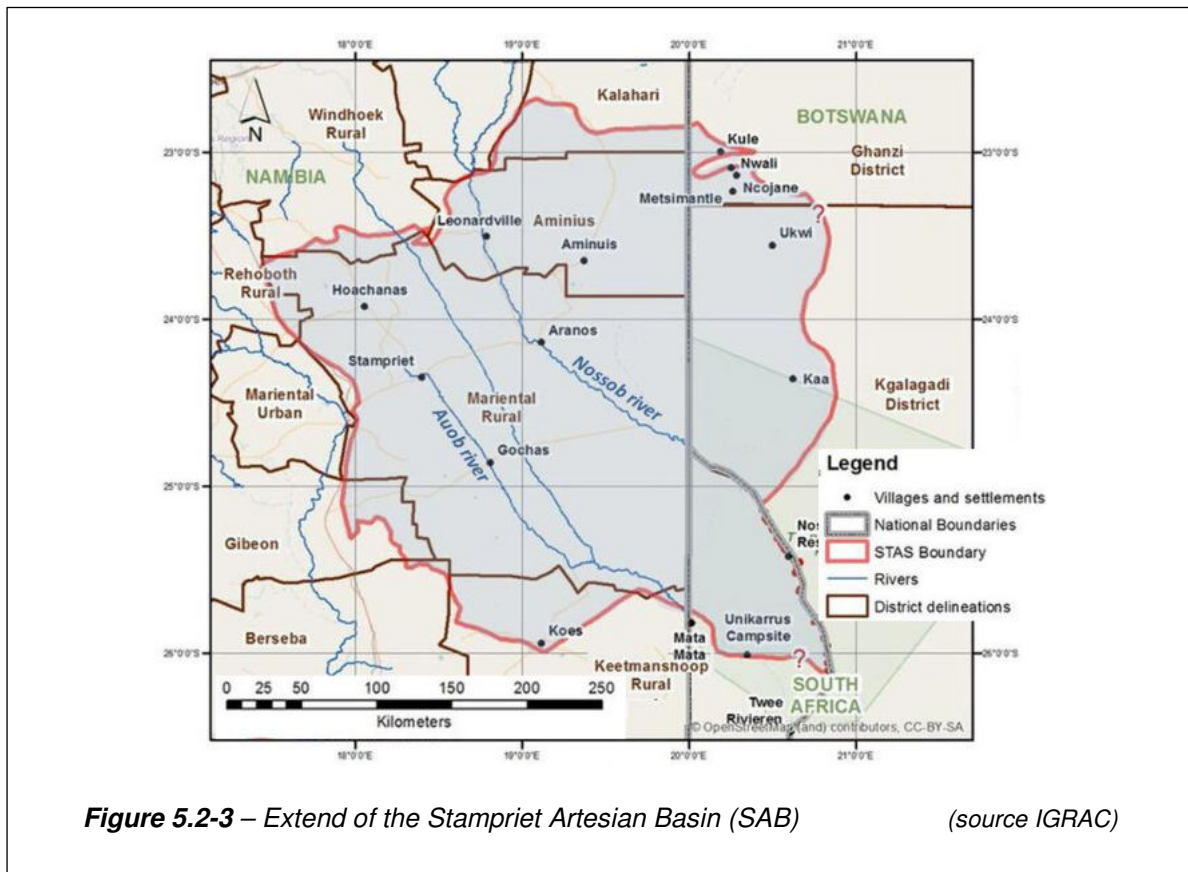
The Remainder of Farm Sponholz No. 140 falls within the Kalahari Group with Kalahari Sand Rock Type. Over millions of years the Kalahari Basin has progressively filled up with sands and water-borne deposits, the nature of which vary according to whether the area was going through a phase of high or low rainfall. The deposits of sands, clay and calcretes that make up the Kalahari Group cover the eastern parts of the Nama Basin. Some of the river systems in the vast area covered by the Kalahari Group remain active, some flow intermittently, while others are essentially dormant at present.

Dune fields have likewise come and gone, and many of the neatly arranged linear dunes in various areas were formed during much drier times long ago. Please refer to the Geohydrology Baseline Report Chapter 3 in Appendix D for a detailed description of the Geology of the area.

**5.2.2.1 Stampriet Artesian Basin (SAB)**

The Stampriet Artesian Basin (SAB) is shared by Namibia, Botswana and South Africa. The presence of fresh water is of special value in the very arid environment where brackish and saline groundwater frequently occur. Although all three countries share the groundwater basin, only Namibia makes significant use of its groundwater. The natural conditions, i.e. groundwater occurrence and quality are more favourable on the Namibian side.

**(i) Extend of the SAB**



**Figure 5.2-3 – Extend of the Stampriet Artesian Basin (SAB)** (source IGRAC)

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The SAB covers an area of approximately 70 000 km<sup>2</sup> in Namibia.

On the east, the basin stretches into Botswana and South Africa across the Namibian border, which runs along the 20° east longitude line.

In the south, the boundary runs along a line south of which no artesian conditions exist.

In the west, the boundary is formed by the escarpment of the Weissrand Plateau along the watershed between the Orange River Basin's Fish River sub-catchment to the west and Auob River sub-catchment to the east.

In the northwest, the boundary follows an arbitrary margin that delineates where sandstone with artesian groundwater may still be encountered under the Kalkrand Basalt.

The northern boundary is visible in the form of sub-outcrops of Karoo strata.

**(ii) Hydrogeology of the SAB**

The three main aquifers in the SAB in Namibia are in the Kalahari Beds, the Auob Sandstone and the Nossob Sandstone. The Auob and the Nossob Sandstone Aquifers lie in the Ecca Group of the lower Karoo Sequence and are separated by shale layers of the Mukorob Member, which is overlaid by Rietmond Shale and Sandstone. The Auob and Nossob Aquifers are confined and free flowing in the Auob Valley from Stampriet and further downstream, as well as in the Nossob Valley around Leonardville. (*Alker, 2007*).

**(iii) Quantity of water in the SAB**

It is estimated that the total quantity of water stored in the SAB's aquifers is 357 billion m<sup>3</sup>, of which 120 billion m<sup>3</sup> (33.6 %) is thought to be present in the Kalahari Aquifer, 180 billion m<sup>3</sup> (50.4 %) in the Auob, and 57 billion m<sup>3</sup> (16,0 %) in the Nossob (*Alker, 2007*).

**(iv) Quality of water in the SAB**

Groundwater quality deteriorates in a south, south-easterly direction, because the Kalahari, in the central parts of the basin, consists mainly of fine sand, silt and clayey deposits. These have accumulated mineral salts due to low rainfall and run-off as well as high evaporation. The confining layer of the Auob Aquifer has also been largely carried away in the south-eastern parts of the pre-Kalahari River, resulting in saline groundwater. That is why the south-eastern area of the SAB is referred to as the "Salt Block", because of the brackish to saline water in the Kalahari, Auob and Nossob Aquifers here.

The quality of artesian water in the upper part of the basin is in the order of 1,000 to 2,000 mg dissolved solids/l, but this deteriorates to more than 5,000 mg dissolved solids/l in the south-eastern parts of the basin (*Alker, 2007*).

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**(v) Recharge of the SAB**

Good progress has been made in understanding the recharge mechanisms in the north-western and western part of the basin (farm Sponholz is situated in the latter). Focused recharge in the region takes place through sinkholes and geological fault lines. It has unfortunately remained difficult to come to definitive conclusions about levels of recharge to the upper layers and the artesian layers.

Most SAB recharge is thought to occur on the Namibian side. Estimates are that recharge to the SAB in normal rainfall years is relatively low, but that considerable recharge may occur during wet years, i.e. about once every fifty years. Recharge to all aquifers in the basin during years with average rainfall is estimated at 105 million m<sup>3</sup>/year, or 0.5 % of rainfall. However, recharge in wet years may be as much as 3 %, or around 1.5 billion m<sup>3</sup>.

It has been confirmed that water tables begin to rise in artesian aquifers some 50 km from these recharge areas a few weeks after heavy rainfall has occurred. In addition, isotopic evaporation of the water in these artesian aquifers is very low or non-existent (*Stone and Edmunds, 2011*).

**(vi) Water extraction from the SAB**

A hydro-census conducted in 2000 found that of a total number of 6,280 boreholes in the SAB, 4,915 are currently in use, of which 3,915 tap the Kalahari Aquifer and 1,000 the artesian aquifers (*Stone and Edmunds, 2011*).

Extraction from the Kalahari Aquifer is estimated to be 9.8 million m<sup>3</sup>/year. This comprises about 65 % of all water extracted in the SAB in Namibia. Of the 1,000 boreholes drilled into artesian aquifers, 200 (20 %) yield artesian flow, while 800 (80 %) tap sub-artesian water levels. 4.97 million m<sup>3</sup>/year are extracted from the Auob Aquifer and 0.2 billion m<sup>3</sup>/year from the Nossob Aquifer.

The depth of the boreholes ranges from 250 to 380 m. The age of the water is less than 40,000 years, and the water temperature is around 30 °C (*Alker, 2007*).

Studies of the SAB indicate that effective control and monitoring of groundwater quantity is essential to establish sustainable use of the resource. To this effect monitoring of the SAB has been improved in order to keep track of abstraction quantities to arrive at results on the basis of which reasonable allocation decisions can be made.

### **5.2.3 Topography and Hydrology**

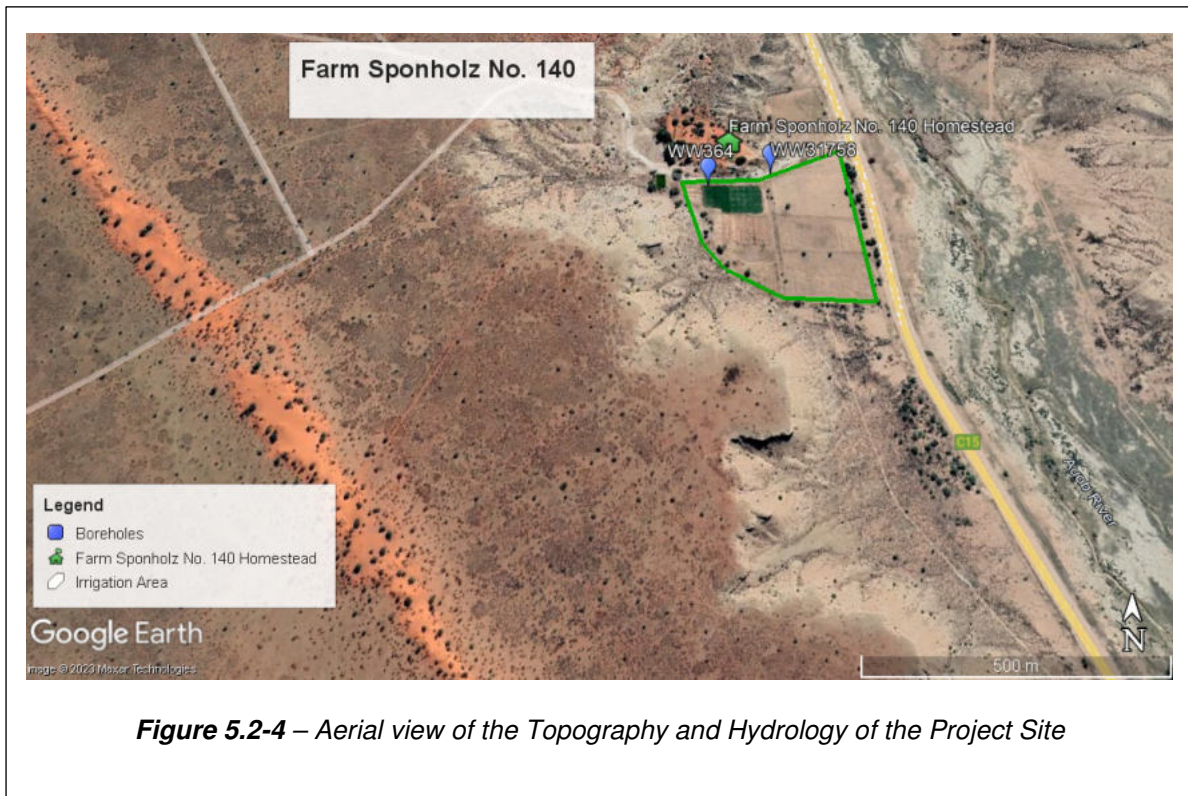
The south-eastern areas of Namibia to the east of the Weissrand are relatively flat with longitudinal sand dunes and linear inter-dune valleys that run in a north - west to south - east direction.

A surface drainage system runs from the northwest to the southeast across the Stampriet Artesian Basin. The Auob, Olifants and Nossob Rivers are ephemeral watercourses that are

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part of the larger Orange River Basin in Southern Africa. These rivers flow only when above-average rainfall occurs, but they are endoreic within the Orange River Basin. This means that their runoff never reaches the Orange River, but rather dissipates into the Kalahari Desert north of the Orange River.

Refer to Photo 5.2-4 for an aerial view of the topography and hydrology of the Project Site. The homestead and current irrigation fields lie within the Auob River Valley on the north-eastern border and to the west (left) a longitudinal north-west to south-east running sand dune is visible.



Also refer to Appendix D Geohydrology Baseline Report Chapter 2, Figure 2 in for a description of the Topography and Hydrology.

## 5.2.4 Soil

The north-eastern part of the farm (including the homestead and current irrigation fields) lies within alluvial soils (*Eutric Flavisols*) of the Auob River Valley. Stretching westward, the soil becomes the general soil type of the Kalahari (*Ferralic Arenosols*) which forms longitudinal dunes alternated by inter-dune valleys covered with *Arenic Calsisols*, where the orchard development is envisaged. Refer to Fig. 5.2-4 to see the transitions between the three soil types.

### 5.2.4.1 *Eutric Flavisols*

Soils along the valleys of river courses, such as the Auob River are called *Flavisols*. Although flooding of these dry riverbeds probably took place hundreds of years ago,



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Flavisols can provide nutrient-rich soils for crop cultivation. *Eutric Fluvisols* can thus be fertile soils with high base saturation. (Coetzee, 2021)

#### **5.2.4.2 Ferralic Arenosols**

The general soil type in the Central Kalahari area is *Ferralic Arenosols*. They are formed from wind-blown sand, with sand generally making up more than 70% of the soil. The depth can extend to at least one metre. The rest of the soil usually consists of some particles of clay and silt.

The sandy texture allows water to drain through the soil rapidly, leaving very little moisture at depths to which most plant roots can reach. Few nutrients are retained in the porous sand. The loose structure of sand means that there is little run-off and water erosion, although it makes the soils susceptible to wind erosion if they are not stabilised by vegetation (Mendelson *et. al.* 2002).

Decalcification of the surface layer is common. As the parent material is chemically inert and the soil contains low quantities of clay minerals and organic carbon, *Arenosols* have low inherent fertility and poor buffering capacity (Coetzee, 2021).

#### **5.2.4.3 Arenic Calcisols**

However, the soil of the interdune valleys (“streets”) in the Kalahari, such as towards the western side of the Remainder of Farm Sponholz, No. 140 can be described as *Arenic Calcisols*. This is evident in the coarse calcic or petrocalcic horizon that occur within the first 100 cm from the surface under reddish Kalahari sand. Refer to photo 5.2-1 which show an example of such shallow calcrete (petrocalcic horizon) in the Kalahari interdune valley, broken up and brought to the surface during preparation of irrigation fields.



**Photo 5.2-1** – Calcrete (petrocalcic horizon) that was unearthed to prepare irrigation fields

*Calcisols* can be productive under irrigation with good management practices for fertilization and to prevent salinisation and erosion (Coetzee, 2021). The following information is applicable for the orchard development on the interdune valley areas.

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*Calcisols* form in alluvial, colluvial and aeolian parent materials that are rich in bases, notably calcium and magnesium. Movement of calcium carbonate [CaCO<sub>3</sub>] from surface horizons to an accumulation layer at some depth is one of the most widespread soil-forming processes in arid climates. The surface horizon is often completely or partially de-calcified, as calcium carbonate is dissolved by rainwater, the calcium [Ca<sup>2+</sup>] and bicarbonate [HCO<sub>3</sub><sup>-</sup>] ions are leached from the upper part of the soil and precipitated as calcite (a form of calcium carbonate) further down where the percolation stops and water evaporates. Alternative wetting (by rain) and drying (by evaporation) of the soil tend to concentrate the calcium carbonate in a calcic horizon. See this layer in photo 5.2-1. In time, calcic horizons can become indurated (cemented, petrified) by calcium carbonate and/or magnesium carbonate into nodular, lamellar or massive, extremely hard petrocalcic horizons (calcrete).

*Calcisols* typically have a thin surface horizon that has low porosity, as soil pores are filled with calcium and magnesium. The sparse vegetation and high temperatures result in low organic matter content. Soil faunal activity is high in these soils.

*Calcisols* have neutral to high pH ( $\geq 7$ ) that may reach 8-8.5 in the subsoil if free carbonates are present. They usually contain high amounts of bases [Ca, Mg, to a lesser extent K]. These will not necessarily be accessible to plants, if excess calcium is present, since the uptake of phosphate and many trace elements are suppressed by the high pH and the predominance of calcium and magnesium.

Most *Calcisols* have fine to medium texture and good water retention. Internal drainage and root development are impeded if the petrocalcic horizon is strongly and continuously cemented. However, a petrocalcic horizon beneath a thick B horizon can be an asset in an arid climate with very sandy soils, as it allows water to be retained in the root zone for longer.

### 5.3 BIO-PHYSICAL ENVIRONMENT

The bio-physical environment was studied through a site visit and literature review (i.e. desktop study).

The Remainder of Farm Sponholz No. 140 falls within the *Southern Kalahari* Biome on Kalahari sandveld and have open *Acacia* woodlands. Low vegetated dunes run in a north-west to south-east direction with flat areas (“streets”) in between dunes as seen in Photo 5.3-1 below. Overall terrestrial diversity and endemism is low (*Mendelson et.al. 2002*).



**Photo 5.3-1** – Example of Southern Kalahari sandveld of the Stampriet area

### 5.3.1 Flora

Plant diversity is low with an estimate of between 50-99 species recorded. (*Mendelson et al. 2002*)

#### 5.3.1.1 Grass

Grasses are prevalent in the “streets” between dunes. Certain grass species are adapted to also occur on the dunes where it provides soil stability to the Kalahari sand and protects the dunes from wind displacement. The predominant grass species in the area is *Smidtia kalahariensis*, known as “suurgras”. This grass species prefers sandveld and is the first grass that sprouts after good rains. It is a hardy annual grass and can grow as high as 1m in good rain seasons. It produces an acid, from where the local name originated.

Other common grass species include various *Stipagrostis* species, such as *Stipagrostis namaquensis*, *S. obtusa*, *S. ciliate*, *S. uniplumis* and *S. hirtigluma*. In the Kalahari duneveld also occurs *Stipagrostis amabilis* where it grows on the crest of dunes. Refer to Appendix E – for a list of grass species and their status, which are likely to occur in the general area.

#### 5.3.1.2 Trees and Shrubs

Conspicuous of the Kalahari landscape is the occurrence of *Acacia erioloba*. Although widespread and common, camelthorn trees are very slow growing and does not regenerate rapidly. *Boscia albitrunca* is another species of concern that can grow to a height of 5 m in this part of the country. Both *Acaia erioloba* and *Boscia albitrunca* are protected under the



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Forest Act No. 12 of 2001 and a permit from the Ministry of Environment, Forestry and Tourism is required to remove any of them.



**Photo 5.3-2** – Camelthorn trees (*Acacia erioloba*) in the Project area

Other tree and shrub species common in the area are various *acacia* species, such as *Acacia hebeclada*, *A. haematoxylon*, *A. karroo*, *A. leuderitzii* and *A. melifera*. Refer to Appendix E for species list of trees and shrubs expected to occur in the general area.

### **5.3.2 Fauna**

It is estimated that at least 45 reptile, 3 amphibian, 47 mammal and 131 bird species are known to or expected to occur in the general area.

#### **5.3.2.1 Reptiles**

At least 45 species of reptiles are expected to occur in the general area of which 12 species are listed as endemic (27% endemism).

Two species expected to occur in the area is classified as vulnerable (Southern African Python and Rock Monitor).

The 45 species of reptiles to occur in the area consist of at least 2 tortoise species (both vulnerable and protected), 19 snakes of which 4 species are endemic (21%), 20 lizards of which 4 species classified as endemic (20% endemic), and 6 geckos of which 4 species are classified as endemic (66% endemic).

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### **5.3.2.2 Amphibians**

Due to the lack of surface water for most of the year, only 3 species of amphibians are listed to occur in suitable habitat in the general Stampriet area. Only one species (African bullfrog) is near threatened, while the other 2 are secure.

### **5.3.2.3 Mammals**

Approximately 47 species of mammals are listed to occur in the general Stampriet area of which 3 species (6.4 %) are classified as endemic and 10 species is known to have conservation concern. Refer to Appendix E for the list of mammals expected to occur in the area and their conservation status.

### **5.3.2.4 Avifauna**

131 Bird species were identified to occur in the general Stampriet area. Conspicuous birdlife observed in the area includes active vulture populations and extensive nests and activities of sociable weavers.



**Photo 5.3-3 – Vultures**



**Sociable weavers nest**

Hardap Recreation Resort is approximately 60 km to the west of the Project Site and is the nearest protected area where all of the species in addition to other water bird species would be found (see Fig. 5.1-1, Section 5.1).

Refer to the avifauna species list in Appendix E for a list of expected bird species and their conservation status in the area.

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## 5.4 LAND USE AND INFRASTRUCTURE

### 5.4.1 Agriculture

The larger area between Stampriet and Gochas consist of freehold farm land. The Remainder of Farm Sponholz No. 140 is zoned for agricultural use.

#### 5.4.1.1 Livestock Farming

The *Southern Kalahari* is suitable for livestock farming and sheep farming is predominant in the area. The Remainder of Farm Sponholz No. 140 is used for sheep and cattle farming and the farm is fenced in with livestock fencing.

#### 5.4.1.2 Irrigation

Compared to other countries, the environmental conditions of Namibia are generally poor suited for agronomic production. The main constraints are water shortage and soils that are low in nutrients and the capacity to retain water.

Farms along the Auob River have, however, been developed for small scale irrigation farming, due to the availability of underground water throughout the year. Special measures are required to enhance production under the challenging environmental circumstances.

##### 5.4.1.2.1 Loss of Agricultural Grazing Land

The development of orchards will result in loss of grazing land for livestock and game. The irrigation development will comprise 100 ha of the total farm of 5 642 ha (i.e. less than 0.02 %) which can be seen as negligible.

### 5.4.2 Protected Areas

Hardap Recreation Resort is the nearest protected area, situated around the Hardap Dam. It is located to the west of the Project Site (Refer to Fig. 5.1-1) and upstream of the nearest ephemeral rivers as well as on the western side of the SAB (Refer to Fig. 5.2-3). It covers an area of 25 000 ha that represents *Dwarf Shrubland Savannah* and to a smaller degree *Southern Kalahari*.

#### 5.4.2.1 Loss of Protected Areas

The protected area approximately 60 km to the west of the farm will not be affected by the activities of the proposed Project or increased water abstraction.

### 5.4.3 Urban Areas and Infrastructure

The Remainder of Farm Sponholz No. 140 is situated approximately 30 km south, south-east of Stampriet village and 40 km north, north-east of Gochas village. It is located approximately 19 km upstream of NamWater's Gochas Water Supply Scheme.

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#### **5.4.3.1 Impact on Urban Areas and Infrastructure**

Groundwater pollution and – levels on the Project Site thus has the potential to negatively affect water supply to Gochas village.

### **5.5 VISUAL AESTHETICS AND SENSE OF PLACE**

#### **5.5.1 Status Quo**

The visual aesthetics and sense of place in the natural environment of the Remainder of Farm Sponholz No. 140 is typical Kalahari veld with red sand, waving grass, acacia shrubs, Shepherd and Camelthorn trees. Refer to Photo 5.3-1, Section 5.3. Orchard development will change the sense of place in the Kalahari savannah.

The Project Site where the orchard development is envisaged, is towards the north-west of the homestead on the plateau that fringe the Auob River Valley in the flat area before the first longitudinal dune (Refer to Fig. 4.3-1).

The total changed surface area add up to 100 ha of the 5 642 ha farm and the 5 542 ha to the south-west of the orchard development will remain natural vegetation for livestock farming.

### **5.6 SOCIO-ECONOMIC ENVIRONMENT**

The Hardap Region is located in the southern parts of Namibia and have a population size of 79 507 with an annual growth rate of 1.5 % from 2001 – 2011. 60 % of the population in the region are situated in urban areas and 40 % in rural areas. The population density is 0.7 people per m<sup>2</sup>. Main languages spoken in the region are Nama/Damara and Afrikaans with a literacy rate of 91 %. Sources of income are Salary and Wages (64.2%), Old age pension (13.4%) and Farming (6.9%) (NSA, 2012).

Approximately 35,000 people live in the Stampriet Artesian Basin (SAB) in Namibia. They extract groundwater from aquifers in the SAB for their domestic water supply, their livestock production and for irrigation. The great majority of the local population is dependent on farming for its livelihood. Hardap region contributes to 19.4 % of the country's livestock production.

Although most crop production in Namibia by far takes place adjacent to the perennial rivers on the northern and southern borders, 3.3% of the country's crop production are done in the Hardap region next to the Harap-, Naute-, Oanob, a few smaller private dams and in areas where sufficient groundwater is available, such as the Project area. The extension of the national electricity supply network to this area has increased the economic viability of irrigation farming, and further expansion will be limited only by the availability of water. Almost no groundwater is used for industrial purposes.

Groundwater for domestic purposes in larger towns in the area is extracted from the Auob Aquifer. Only the town of Koës in the south uses water from the Nossob Aquifer. The subartesian aquifers at Aminuis have maintained their yields over many years, but other boreholes in the same aquifer have lower yields. At Leonardville, over-extraction has caused a large local drop in the water table, but at Aranos in the northwest the aquifer continues to supply sufficient water of good quality (although fine sand entering the boreholes causes operational problems). The town of Gochas formerly obtained water from the Auob Aquifer, but this groundwater gradually became contaminated with salt water from the overlying 150 m thick Kalahari Aquifer, and it proved necessary to move the boreholes to a more suitable well field some 10 km to the north (*Alker, 2007*). Gochas currently receives water supply from NamWater's Gochas Water Supply Scheme, some 19 km downstream of the Project Site.

Stakeholders in the area will have to determine the ecological and social sustainability of available water in the SAB.

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## 6 PUBLIC CONSULTATION

Public consultation and participation are an important aspect of an EA process. During public consultation, potential impacts that the proposed project may have on the natural and/or socio-economic environments, were identified. Consultation with Interested and Affected Parties (I&APs) and relevant Authorities enables transparent decision-making.

This chapter describes in detail the full extent of the public consultation process that was followed and the I&APs and authorities that were notified of the study being undertaken. It also includes the main issues and concerns raised during the public consultation process and comments received on the Background Information Letter (BIL) distributed during the first round of public consultation.

Public consultation for the purposes of this project was done as prescribed by Regulations 21 to 24 of the Environmental Impact Assessment Regulations (GN. 30 of 2012).

### 6.1 PUBLIC ENGAGEMENT

#### 6.1.1 First Round of Consultation

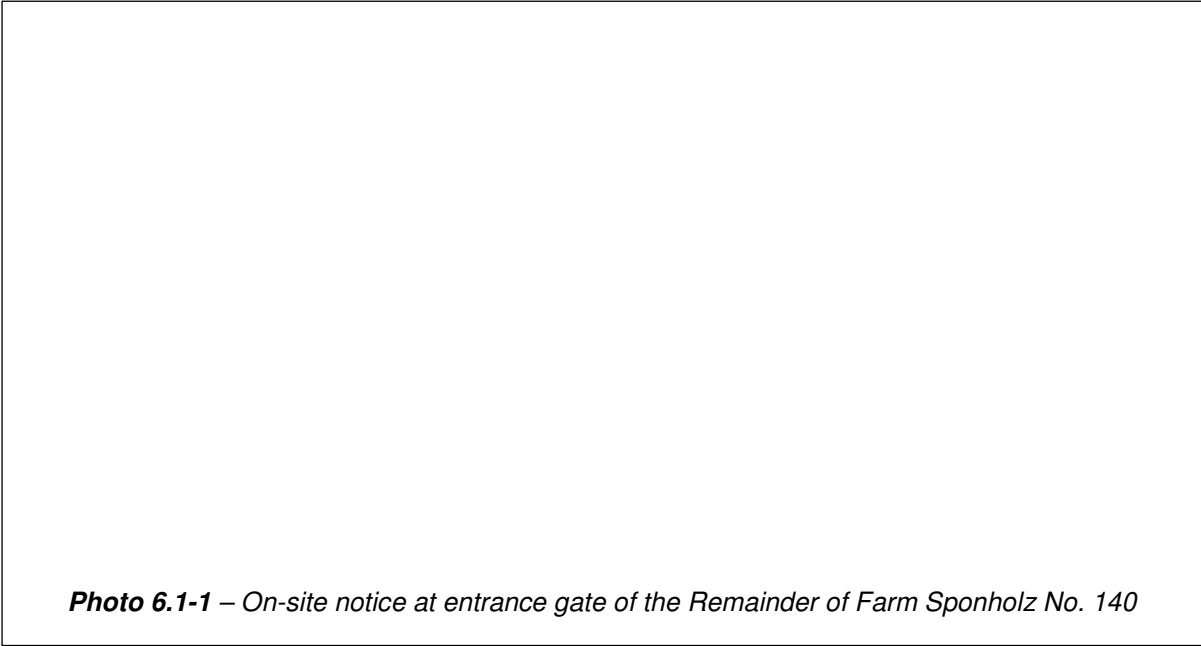
Engagement with the public and authorities as part of the first round of public consultation commenced on the 27<sup>th</sup> of September 2022 and concluded on the 18<sup>th</sup> of October 2022. During the first round of consultation, I&APs and authorities were given an opportunity to register and submit comments and/or concerns on the proposed project.

##### *6.1.1.1 Activities of Public Engagement*

Activities undertaken to date to ensure effective and adequate I&AP involvement, are as follows:

- A list of predetermined I&APs and authorities was compiled. A total of 47 I&APs were included on the database (Appendix F1).
- A notification email (Appendix F2) with Background Information Letter (BIL) (Appendix F3) was sent to all pre-identified I&APs and authorities (Appendix F1) on 27 September 2022.
- Notification letters (Appendix F4) with BIL (Appendix F3) was hand delivered on 27 September 2022 (Appendix F5) to line ministries (Appendix F1) and State Owned Enterprises situated in Windhoek.
- Notification letters with BIL (Appendix F6) was sent via courier (Appendix F7) to the Regional and Local Authorities (Appendix F7) on 26 September 2022.
- Notification letters (Appendix F8) with BIL (Appendix F3) was sent via registered post (Appendix F9) to the neighbouring farm/property owners on 26<sup>th</sup> of September 2022.

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- Public notices announcing the commencement of the EA and an invitation to register as an I&AP were placed in 'The New Era' and 'Die Republikein' newspapers on 27 September 2022 and 04 October 2022 (Appendix F10).
  - A notice board (with the dimensions 60cm x 42cm) was placed at the Hardap Regional Council, the Mariental Rural Constituency office and at the Stampriet Village Council office notice board (Appendix F11). An On-site notice was placed at the Rem. Farm Sponholz No. 140 gate entrance area (Appendix F12).



**Photo 6.1-1** – On-site notice at entrance gate of the Remainder of Farm Sponholz No. 140

#### **6.1.1.2 Comments Received and Responses Provided**

All comments and feedback received from I&APs and Authorities are summarised in Table 6.1-1 below, while a copy of the original correspondence is attached as Appendix F13. Five I&APs have registered.

**Table 6.1-1:** Comments received during the first round of public consultation

NO.	NAME	COMMENTS	NAME	RESPONSE
1.	<p>MURD – Control Admin Officer Frieda Sindano (27/09/2022)</p>	<p>Dear Mr. van Zyl</p> <p>We acknowledge, with thanks, receipt of your letter dated 27 September 2022 on the above-captioned subject matter.</p> <p>Your letter has been forwarded to the office of the Director: Habitat and Housing Development for attention and facilitation of the required action. Mr. Kondunda can be reached at 061 297 5062 and email <a href="mailto:hsecretary@murd.gov.na">hsecretary@murd.gov.na</a></p> <p>Frieda Sindano Control Administrative Officer Tel: 061 – 227 880 / Fax: 061 – 258131/ Email: fsindano@murd.gov.na / www.murd.gov.na</p>	<p>Urban Green cc</p>	
2.	<p>Tristone Business Trust Octavia on behalf of Dr Joggie Briedenhann (27/09/2022)</p>	<p>Dear Julia</p> <p>Our telephonic conversation earlier this afternoon has reference.</p> <p>Below please find the personal particulars of Dr SJ Briedenhann to be registered as an I&amp;AP.</p> <p>Dr Siebert J. Briedenhann (Joggie)</p>	<p>Urban Green cc (27/09/2022)</p>	<p>Dear Ms Octavia,</p> <p>Your email below refers.</p> <p>Dr Briedenhann has been registered as an I&amp;AP and will be kept informed throughout the project.</p> <p>Please let us know should you have any questions.</p> <p>Kind regards</p>



NO.	NAME	COMMENTS	NAME	RESPONSE
		<p>PO Box 40257                      Ausspannplatz                      Windhoek                      081 231 6169                      jbried@joggie.com.na                      Farm owner of Hartebeestloop No.202,                      +-30km south-east of Stampriet                      Yours sincerely                      Octavia on behalf of Dr Joggie Briedenhann / Tristone Business Trust</p>		<p>Julia L. Bashir</p>
	<p>Tristone Business Trust                      Dr Joggie Briedenhann                      (17/10/2022)</p>	<p>Dear Julia                      Thank you for the documentation – it is much appreciated.                      I refer to page 2 last paragraph. Does the scope of study by the hydrogeologist include a numerical groundwater flow modelling of the Kalahari and Auob Aquifers in the Stampriet Transboundary Aquifer System (STAS) for the purposes of assessing the impact of proposed increased water abstraction?                      Could you also confirm if the integrity of the 2 irrigation boreholes mentioned (WW364</p>	<p>Urban Green cc</p>	

NO.	NAME	COMMENTS	NAME	RESPONSE
		<p>and WW31758) has been investigated via camera and video analyses?</p> <p>Best regards</p> <p>Joggie Briedenhann</p> <p>(Tristone Business Trust)</p>		
	<p>Tristone Business Trust</p> <p>Dr Joggie Briedenhann</p> <p>(17/10/2022)</p>	<p>Dear Julia</p> <p>Sorry for the 2nd e-mail.</p> <p>I would also recommend a staggered approach to the increased abstraction request. This will allow the owner and hydrogeologist to assess the feasibility of the proposed cultivations and also the influence of the increased abstraction over a period of time. It seems that a cautious approach of a staggered increase in water abstraction is currently favored by the Ministry of Agriculture, Water and Land Reform in the best interest of the longterm stability and sustainability of aquifer.</p> <p>Best regards</p> <p>Joggie Briedenhann</p>	<p>Urban Green cc</p> <p>(18/10/2022)</p>	<p>Dear Mr Briedenhann,</p> <p>Good day. The above mentioned subject refers.</p> <p>We confirm receipt of your comments in the below emails.</p> <p>Your comments have been forwarded to the hydrogeologist (Mr Otto van Vuuren) for his consideration and further assessment of the study.</p> <p>Should you have any further query, please let us know.</p> <p>Kind regards</p> <p>Julia L. Bashir</p>
<p>3.</p>	<p>Farm Owner of Farm Stiltevrede No. 654, Farm Nabas No. 668, &amp;</p>	<p>Mr Brand van Zyl</p> <p>Urban Green CC</p>	<p>Urban Green cc</p> <p>(05/10/2022)</p>	<p>Dear Mr. R.S. Kotze,</p> <p>Your email communication below refers.</p>

NO.	NAME	COMMENTS	NAME	RESPONSE
	Farm Boomplaas No. 386 - Rudi Smit Kotze  (05/10/2022)	<p>Dear sir</p> <p>Thank you for your letter informing me of the proposed increase in abstraction of groundwater on neighbouring farm Sponholz.</p> <p>I am not opposed to any progress or development, but 430 000 m<sup>3</sup>/a will for sure have an impact on my water supply. I suggest your client obtain the standard quota of 199 000 m<sup>3</sup>/a as for now. During this period we can determine what the impact is on my property and what his needs are.</p> <p>Yours faithfully</p> <p>Rudi Smit Kotze</p> <p>Farm Stiltevrede 654</p> <p>PO Box 58</p> <p>Stampriet</p> <p>Farm Nabas 668</p> <p>PO Box 58</p> <p>Stampriet</p> <p>Farm Boomplaas 386</p> <p>PO Box 58</p>		<p>We take note of your concern and proposal. A hydrogeologist has been appointed by the owner of Farm Sponholz to undertake the necessary assessment, which will be shared with you.</p> <p>Should there be any further questions/comments, please let us know.</p> <p>Regards</p> <p>Brand van Zyl</p>

NO.	NAME	COMMENTS	NAME	RESPONSE
		Stampriet		
4.	Farm Owner of Farm Nu-Aub No. 629 – Gerhard van Wyk  (05/10/2022)	Mr Brand van Zyl Urban Green CC  Dear sir  Thank you for your letter informing me of the proposed increase in abstraction of groundwater on neighboring farm Sponholz.  I am not opposed to any progress or development, but 430 000 m3/a will for sure have an impact on my water supply. I suggest your client obtain the standard quota of 199 000 m3/a as for now. During this period we can determine what the impact is on my property and what his needs are.  Yours faithfully  GERHARD VAN WYK  Farm Nu-Aub No. 629  Stampriet	Urban Green cc  (05/10/2022)	Dear Mr. G. van Wyk,  Your email communication below refers.  We take note of your concern and proposal. A hydrogeologist has been appointed by the owner of Farm Sponholz to undertake the necessary assessment, which will be shared with you.  Should there be any further questions/comments, please let us know.  Regards  Brand van Zyl
5.	NAWATER Environmental Division	Dear Julia/Brand  Please register NamWater as an I&AP with	Urban Green cc  (18/10/2022)	Dear Jolanda,  Your email communication below refers.

NO.	NAME	COMMENTS	NAME	RESPONSE
	<p>Jolanda Kamburona (17/10/2022)</p>	<p>the following contact details:</p> <p>Jolanda Kamburona Kamburonaj@namwater.com.na +264 81 144 1528</p> <p>Fillemon Aupokolo Aupokolof@namwater.com.na +264 81 325 3301</p> <p>Kindly forward the geohydrological assessment report for the two existing boreholes (if available). NamWater has water supply boreholes in Stampriet and NamWater needs to ensure that the increased abstraction does not negatively affect NamWater’s water supply from these boreholes.</p> <p>Regards,</p>		<p>NamWater has been registered as an I&amp;AP and will be kept informed.</p> <p>The geohydrological assessment report will be provided to NamWater in due course.</p> <p>Regards Brand van Zyl</p>
<p>6.</p>	<p>Fricourt Number 199 Trust - Corinus Kotzé Remainder of PTN 2 of Farm Fricourt No. 199 (24/10/2022)</p>	<p>Good afternoon,</p> <p>Thank you for your letter informing me of the proposed increase in abstraction of groundwater on neighboring Remainder of Farm Sponholz No. 140.</p> <p>My reply below is on behalf of Remainder of PTN 2 of Farm Fricourt Number 199 - registered in the name of Concorde Property Management (Pty) Ltd, PO Box 80356, Windhoek trading as Fricourt</p>	<p>Urban Green cc (24/10/2022)</p>	<p>Dear Corinus Kotze,</p> <p>Your email communication refers.</p> <p>We confirm receipt of your email communication and concern with respect to the requested abstraction volume.</p> <p>Your comment has been forwarded to the hydrogeologist (Mr Otto van Vuuren) for his consideration and further assessment of the</p>

NO.	NAME	COMMENTS	NAME	RESPONSE
		<p>Number 199 Trust represented by Corinus Kotzé, Tel +264811299828.</p> <p>I am opposed to the amount of 430 000 m3/a which will for sure have a negative impact on my water supply. I suggest the owner of Farm Sponholz No. 140 obtain the standard quota of 199 000 m3/a for now and re-apply for additional water usage in the future.</p> <p>The full impact of the activities can only be determined during the next 2 years and the impact it will have on the water levels on my property and whether it really is needed for Farm Sponholz No. 140 to have 430 000 m3/a.</p> <p>My other main concern is that if approval is given to Farm Sponholz No 140 to abstract 430 000 m3/a, the impact can be tremendously disastrous on the environment and who will be liable for my losses? Who will be responsible for the loss of water on my farm that will lead to the loss of income.</p> <p>Currently all the farms south ("below") Farm Sponholz No. 140 already have weak pressure.</p> <p>Regards</p>		<p>study.</p> <p>Should there be any other questions, please let us know.</p> <p>Regards</p> <p>Brand van Zyl</p>

NO.	NAME	COMMENTS	NAME	RESPONSE
		<p>Corinus Kotzé corinus.kotze@gmail.com</p>		
7.	<p>Farm Schilflage No. 143 - Hendrik Jacobus Kotze (25/10/2022)</p>	<p>Good afternoon</p> <p>Thank you for your letter informing me of the proposed increase in abstraction of groundwater on neighboring Remainder of Farm Sponholz No. 140.</p> <p>My reply below is on behalf of Farm Schilflage Number 143 - registered in the name of Hendrik Jacobus Kotze, PO Box 33, Stampriet represented by Corinus Kotzé, Tel +264811299828.</p> <p>I am opposed to the amount of 430 000 m<sup>3</sup>/a which will for sure have a negative impact on my water supply. I suggest the owner of Farm Sponholz No. 140 obtain the standard quota of 199 000 m<sup>3</sup>/a for now and re-apply for additional water usage in the future.</p> <p>The full impact of the activities can only be determined during the next 2 years and the impact it will have on the water levels on my property and whether it really is needed for Farm Sponholz No. 140 to have 430 000 m<sup>3</sup>/a.</p> <p>My other main concern is that if approval is</p>	<p>Urban Green cc (26/10/2022)</p>	<p>Dear Mr Kotze,</p> <p>Your below email communication refers.</p> <p>We confirm receipt of your email communication and concern with respect to the requested abstraction volume.</p> <p>Your comment has been forwarded to the hydrogeologist (Mr Otto van Vuuren) for his consideration and further assessment of the study.</p> <p>Should there be any other questions, please let us know.</p> <p>Kind regards Julia L. Bashir</p>

NO.	NAME	COMMENTS	NAME	RESPONSE
		<p>given to Farm Sponholz No 140 to abstract 430 000 m<sup>3</sup>/a, the impact can be tremendously disastrous on the environment and who will be liable for my losses? Who will be responsible for the loss of water on my farm that will lead to the loss of income.</p> <p>Currently all the farms south ("below") Farm Sponholz No. 140 already have weak pressure.</p> <p>Regards</p> <p>Corinus Kotzé</p> <p>corinus.kotze@gmail.com</p>		



## **6.1.2 Second Round of Consultations**

Engagement with the public and authorities as part of the second round of public consultation commenced on the 13<sup>th</sup> of March 2023 and concluded on the 28<sup>th</sup> of March 2023. During the second round of consultation, I&As and authorities were given an opportunity to submit comments on the Draft Scoping Report.

### ***6.1.2.1 Activities of Public Engagement***

Activities during the 2<sup>nd</sup> round to ensure effective and adequate I&AP involvement, are as follows:

A notification email (Appendix F14) informing all affected authorities and registered I&APs of the availability of the Draft Scoping Report and request for comment was distributed on 13 March 2023. The email correspondence (Appendix F15) and proof of successful delivery of emails is attached as Appendix F16.

### ***6.1.2.2 Comments Received and Responses Provided***

All comments and feedback received from I&APs and Authorities are summarised in Table 6.1-2 below, while a copy of the original correspondence is attached as Appendices F15.

**Table 6.1-2:** Comments received during the second round of public consultation

NO.	NAME	COMMENTS	NAME	RESPONSE
1.	Hanjörg Drews (13/03/2023)	Hi Julia,  Your e-mail below refers. We would appreciate to receive an electronic copy of the ESA Report.  Many thanks in advance,  Hanjörg Drews.	Urban Green cc (13/03/2023)	Dear Drews,  Your email below refers.  Find attached the electronic copy of the draft ESA Report (without appendices) for the irrigation at Rem. Farm Sponholz No. 140, Stampriet, Hardap Region.  Please confirm receipt of the draft ESA Report. Thank you.  Kind regards  Julia L. Bashir
	Hanjörg Drews (13/03/2023)	Many thanks Julia, well received.  Kind regards,  Hanjörg.	Urban Green cc	
2.	Namibia Water Corporation Environmental Scientist  Water Quality & ES  Jolanda Kamburona (13/03/2023)	Dear Julia,  Kindly share the electronic copy.  Regards,  Jolanda	Urban Green cc (13/03/2023)	Dear Jolanda,  Your email below refers.  Find attached the electronic copy of the draft ESA Report (without appendices) for the irrigation at Rem. Farm Sponholz No. 140, Stampriet, Hardap Region.  Please confirm receipt of the draft ESA Report. Thank you.

NO.	NAME	COMMENTS	NAME	RESPONSE
				Kind regards Julia L. Bashir
	Namibia Water Corporation Environmental Scientist Water Quality & ES Jolanda Kamburona (13/03/2023)	Dear Julia, Received, thank you. Regards, Jolanda	Urban Green cc	
	Namibia Water Corporation Environmental Scientist Water Quality & ES Jolanda Kamburona (22/03/2023)	Dear Julia, NamWater has the following comments/inputs on the above mentioned ESIA:  1. NamWater's concerns are mainly groundwater pollution that might come from fertilizer leakage due to over irrigation and spillage of hazardous substances and decline in groundwater levels.  2. How far does the groundwater monitoring program cover in terms of distance? We would like to have an idea how the Stampriet Artesian Aquifer behave over time.  3. It was also good to see the results of the updated groundwater model of the	Urban Green cc (04/04/2023)	Dear Jolanda Thank you for your e-mail. We take notice of NamWater's concerns regarding groundwater pollution and –levels with reference to the Gochas Water Supply Scheme. For this project groundwater monitoring will take place on the Remainder of Farm Sponholz No. 140 only. However, one of the conclusions of our study is that a Strategic Assessment by DWA is recommended to determine the overall impact of developing irrigation schemes on the Stampriet Artesian Basin (SAB). The need for the implementation of a rigorous monitoring system for the SAB by MAWF also became evident and is recommended from

NO.	NAME	COMMENTS	NAME	RESPONSE
		<p>Stampriet Artesian Aquifer with such abstraction scenarios at farm Sponholz 140, the rest lies with Authority DWA.</p> <p>4. Farm Sponholz is located about 19 km upstream of NanmWater’s Gochas Water Supply Scheme, in view of that our concern is pollution of the groundwater source. However, as indicated in the report, the impact should there be spillages etc., will be more in the immediate extend of the contaminant source.</p> <p>5. DWA should ensure that there are conditions for groundwater monitoring and continuous evaluation as part of the irrigation permit. This will ensure data collection and so that remedial measures can be made timely should the need arise.</p> <p>Regards, Jolanda</p>		<p>herewith forward.</p> <p>Your input will be incorporated into the Final Scoping Report.</p> <p>Kind regards Julia L. Bashir</p>
3.	<p>Hardap Regional Council Governor’s office</p> <p>Mr Leonard (13/03/2023)</p>	<p>Good afternoon Julia.</p> <p>I do not have a clue of what this is all about but I keep on receiving mail in this regard. I even wonder where you got hold of my e-mail address. Could you please remove me from your address list as I do not believe I am the relevant intended recipient of the information you are sharing.</p>	<p>Urban Green cc (13/03/2023)</p>	<p>Dear Leonard,</p> <p>The above mentioned subject refers.</p> <p>Your details were obtained from the office of the Hardap Regional Council Governor’s office during your designation as PA at the mentioned office which was also confirmed by the current PA today.</p>

NO.	NAME	COMMENTS	NAME	RESPONSE
		Thanking you in advance Leonard		Nevertheless, should you not wish to be informed as part of the above mentioned project, we take notice and respect your wishes in this regard. Thank you.  Kind regards Julia L. Bashir
4.	Octavia on behalf of Dr Briedenhann (13/03/2023)	Dear Julia I trust that you are well.  Kindly forward an e-copy of the ESA report to me via e-mail please? Kindly note that Dr Briedenhann may request a personal meeting with a consultant at Urban Green.  Kindest regards Octavia on behalf of Dr Briedenhann	Urban Green cc (13/03/2023)	Dear Octavia, Your email below refers.  We take notice of the possible meeting with Dr Briedenhann, and therefore recommend that a date be set well in advance in this regard.  Find attached the electronic copy of the draft ESA Report (without appendices) for the irrigation at Rem. Farm Sponholz No. 140, Stampriet, Hardap Region.  Please confirm receipt of the draft ESA Report. Thank you.  Kind regards Julia L. Bashir
5.	Farm Nu-Aub Christelle van Wyk (14/03/2023)	Good day Can I please have a copy of the Report. With thanks	Urban Green cc (14/03/2023)	Dear Christelle, Your email below refers.  Find attached the electronic copy of the draft ESA Report (without appendices) for the

NO.	NAME	COMMENTS	NAME	RESPONSE
		C van Wyk		irrigation at Rem. Farm Sponholz No. 140, Stampriet, Hardap Region.  Please confirm receipt of the draft ESA Report. Thank you.  Kind regards  Julia L. Bashir
	Farm Nu-Aub Gerhard & Christelle van Wyk (15/03/2023)	Morning Julia  Thank you so much for the report.  We stand by our decision to oppose the abstraction of ground water. The impact can be disastrous taken into account El Nino once again on our doorsteps. Situated south of Farm Sponholz we already experience weaker artesian flow as a result of all the irrigation north from us. And our main concern – are all water levels and abstraction volumes monitored?  Kind regards  Gerhard & Christelle van Wyk  Farm Nu-Aub	Urban Green cc (16/03/2023)	Dear Mr. and Mrs. Van Wyk,  Thank you for your response.  We take further note of your concern and will incorporate it into the Final Report to the MET and MAWLR, who will ultimately make the decision based on the information obtained.  It became evident during this study that monitoring will play an increase importance in the Stampriet Artesian Basin area, due to the increase in irrigation development along the Auob River.  Your concern regarding monitoring is thus duly noted.  Kind regards  Julia L. Bashir
6.	H K Rakow (16/03/2023)	Hi Julia  I would like a copy of environment impact	Urban Green cc (16/03/2023)	Dear Mr Rakow,  Your email below refers.

NO.	NAME	COMMENTS	NAME	RESPONSE
		assessment please. Regards H K Rakow		Find attached the electronic copy of the draft ESA Report (without appendices) for the irrigation at Rem. Farm Sponholz No. 140, Stampriet, Hardap Region.  Please confirm receipt of the draft ESA Report. Thank you.  Kind regards  Julia L. Bashir

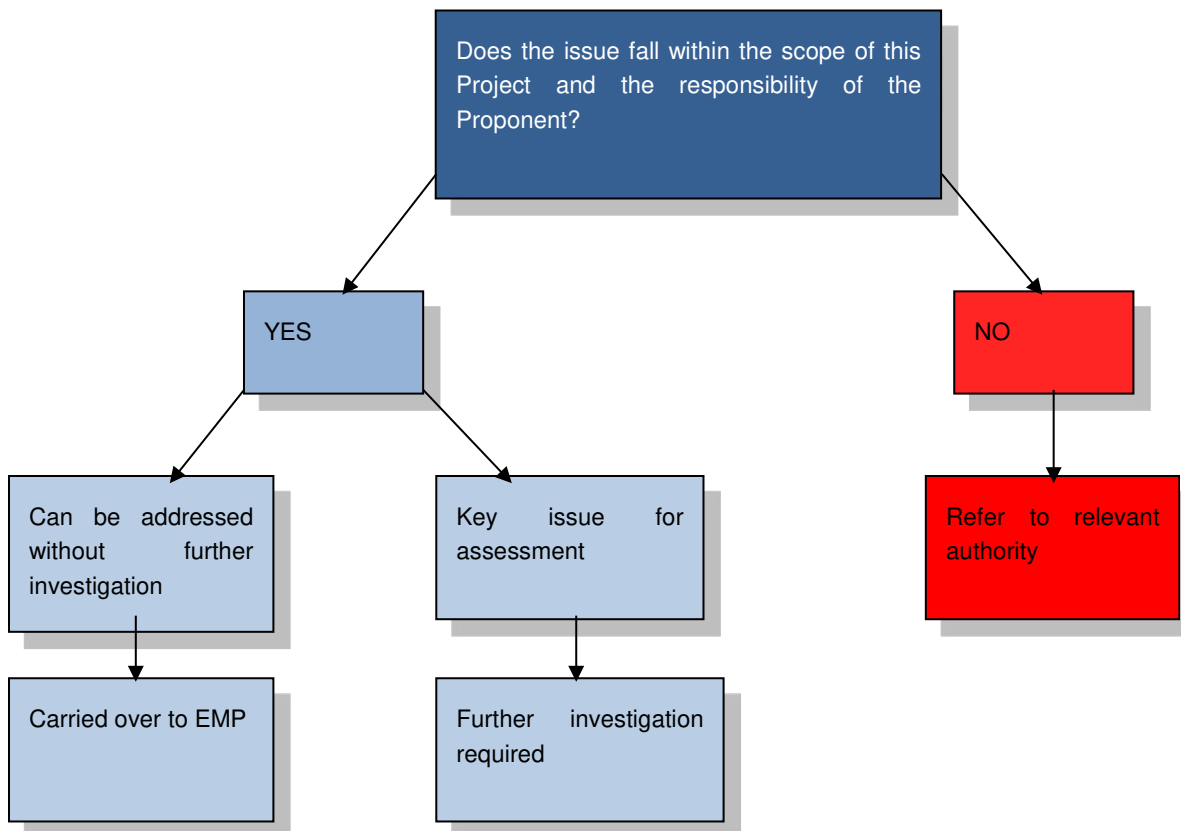
## 7 ASSESSMENT OF ENVIRONMENTAL ISSUES, POTENTIAL IMPACTS AND MITIGATIONS

This chapter provides a description and assessment of the key issues of concern and potential impacts associated with increased groundwater abstraction and the proposed irrigation development. Mitigation measures relevant to the Project as appropriate are recommended. These measures are aimed at avoiding, minimising or rehabilitating negative impacts or enhancing potential benefits. The significance of potential impacts without and with mitigation is also provided.

The Environmental Assessment Process consisted of two phases, the first being the screening phase and the second the scoping phase, as explained below.

### 7.1 SCREENING PHASE METHODOLOGY

Each of the potential impacts identified during public consultation and the scoping assessment was screened according to a set of questions (Figure 7.1-1), which resulted in highlighting the key impacts requiring further assessment.



**Figure 7.1-1:** Screening process for determining key impacts



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This list of impacts that were subjected to a scoping assessment is presented in Table 7.4, Section 7.4, as per the evaluation criteria presented in Table 7.2-1 below.

### **7.1.1 Positive Impacts**

The following positive impacts were identified during the screening process and should be mentioned for consideration during the Environmental Assessment:

#### ***7.1.1.1 Contribution to National Agricultural Policy***

Please refer to Section 4.1.2 where the Namibia Agriculture Policy 2015 is examined. This project is in line with the strategy to focus on increased agricultural production, agro-processing and marketing as well as real farm income as a contribution to national household food security. The Project has the potential to develop the agriculture sector across the value chain and accelerate agricultural contribution to the National GDP.

#### ***7.1.1.2 Contribution to National Food Security***

The Project will contribute positively to the country's food security programme by delivering olives and olive products to the local market.

#### ***7.1.1.3 Socio-Economic Benefits***

The new owner of the Remainder of Farm Sponholz No. 140 currently provide employment to one permanent employee. It is envisaged that another 4 permanent employees as well as 15 additional temporary workers will be required if/when the orchard development take place. When the orchard is established, permanent employees will be increased to 10 and approximately 50 temporary workers will be required ad hoc during harvesting.

This will contribute positively to job creation to the communities of Stampriet, Gochas and Witkrans in the Hardap Region, from where labour will be sourced and where little other economic activities take place.

#### ***7.1.1.4 Capital investment***

The development of the Remainder of Farm Sponholz No. 140 means capital investment to the estimated amount of N\$ 20 000 000 in the agricultural sector of the Hardap region.

## **7.2 SCOPING ASSESSMENT METHODOLOGY**

The key impacts, identified after carrying out screening (see Section 7.1 above), were evaluated in terms of extent (spatial scale), duration (time scale), intensity (magnitude) and probability. The means of arriving at the different significance ratings is explained in Table 7.2-1 below.

These criteria are used to ascertain the *significance* of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The significance of an impact is derived by considering the temporal and spatial scales and magnitude. Such significance

is also informed by the context of the impact, i.e. the character and identity of the receptor of the impact.

**Table 7.2-1: Criteria for impact evaluation**

CRITERIA	CATEGORY
<b>Impact</b>	This is a description of the expected impact
<b>Nature</b>	<p><b>Positive</b> – environment overall will benefit from the impact</p> <p><b>Negative</b> – environment overall will be adversely affected by the impact</p> <p><b>Neutral</b> – environment overall will not be affected</p>
<b>Extent</b>	<p><b>Site Specific:</b> Expanding only as far as the activity itself (<i>onsite</i>)</p> <p><b>Local:</b> Restricted to immediate environment within 5 km of the site</p> <p><b>Regional:</b> Within the Hardap region</p> <p><b>National:</b> Within Namibia</p>
<b>Duration</b>	<p>Reviews the lifetime of the impact, as being -</p> <p><b>Very short</b> – days, &lt;3 days</p> <p><b>Short</b> - days, &lt;1 month)</p> <p><b>Medium</b> - months, &lt;1 year</p> <p><b>Long</b> - years, 1 -10 years</p> <p><b>Permanent</b> - &gt;10 years</p>
<b>Intensity</b>	<p>Establishes whether the magnitude of the impact is destructive or innocuous and whether it exceeds set standards, and is described as –</p> <p><b>None</b> (No environmental functions and processes are affected);</p> <p><b>Low</b> (Environmental functions and processes are negligibly affected);</p> <p><b>Medium</b> (Environment continues to function but in a noticeably modified manner);</p> <p><b>High</b> (Environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).</p>
<b>Probability</b>	Considers the likelihood of the impact occurring and is described as –

CRITERIA	CATEGORY
	<p><b>Improbable</b> (low likelihood),</p> <p><b>Probable</b> (distinct possibility),</p> <p><b>Highly probable</b> (most likely) or</p> <p><b>Definite</b> (impact will occur regardless of prevention measures).</p>
<p><b>Significance</b> <b>(no mitigation)</b></p>	<p><b>None</b> (A concern or potential impact that, upon evaluation, is found to have no significant impact at all)</p> <p><b>Low</b> (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design)</p> <p><b>Moderate</b> (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation)</p> <p><b>High</b> (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a “no go” implication for the project unless mitigation or re-design is practically achievable)</p>
<p><b>Mitigation</b></p>	<p>Description of possible mitigation measures</p>
<p><b>Significance</b> <b>(with mitigation)</b></p>	<p><b>None</b> (A concern or potential impact that, upon evaluation, is found to have no significant impact at all)</p> <p><b>Low</b> (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design)</p> <p><b>Moderate</b> (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation)</p> <p><b>High</b> (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a “no go” implication for the project unless mitigation or re-design is practically achievable)</p>
<p><b>Confidence level</b></p>	<p>The degree of confidence in the predictions, based on the availability of information and specialist knowledge.</p> <p><b>Low</b> (based on the availability of specialist knowledge and other information)</p> <p><b>Medium</b> (based on the availability of specialist knowledge and other information)</p> <p><b>High</b> (based on the availability of specialist knowledge and other information)</p>

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The decision as to which combination of alternatives and mitigation measures to apply lies with the Proponent, and their acceptance and approval ultimately with the relevant Competent Authority.

### 7.3 MITIGATION APPLICATION METHODOLOGY

There is a hierarchy of actions which can be undertaken to respond to any development or activity. These cover avoidance, minimisation and compensation. It is possible and considered sought after to enhance the environment by ensuring that positive gains are included in the development. If negative impacts occur then the hierarchy, as a guiding philosophy, recommends the following steps.

**Impact avoidance:** This step is most effective when applied at an early stage of project planning. It can be achieved by:

1. not undertaking certain actions or elements that could result in adverse impacts;
2. avoiding areas that are environmentally sensitive; and
3. putting in place preventative measures to stop adverse impacts from occurring.

**Impact minimisation:** This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

4. scaling down or relocating the proposal;
5. redesigning elements of the project; and
6. implementing mitigation measures to manage the impacts.

**Impact compensation:** This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

7. rehabilitation of the affected site or environment, for example, by habitat enhancement;
8. restoration of the affected site or environment to its previous state or better; and
9. replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

### 7.4 POTENTIAL IMPACTS IDENTIFIED AND ASSESSED

As all developments have potential negative environmental consequences, identifying the most important faunal species including high risk habitats beforehand, coupled with environmentally acceptable mitigating factors, lessens the overall impact of such development. The information presented in this section has mainly been drawn from the Proponent's information regarding the proposed irrigation expansion and increase groundwater abstraction, specialist studies and public engagement that was undertaken as part of this phase of the EIA process.

Table 7.4 presents the potential impacts that might occur during increased groundwater abstraction and drip irrigation development, preparation and cultivation, while Table 7.4-1 to Table 7.4-9 presents each potential impact and outcome in detail.

All impacts can be viewed as negative, unless otherwise mentioned. Positive impacts have been listed in Section 4.5 and 7.1.1.

**Table 7.4 - Potential impacts to consider:**

IMPACT	CAUSE
Loss of Biodiversity and Habitat Destruction	Clearing of natural vegetation for monoculture orchards
	Illegal removal of protected plant species
	Trenching to lay pipes
	Tracks and roads to/around/in orchard
	Proliferation of invertebrate and vertebrate pests and disease carriers
	Over administration of herbicides and pesticides
	Dust
Groundwater Reduction	Over abstraction of groundwater from the SAB for irrigation
	Unacceptable high levels of consumption
	Wastage
Groundwater Pollution	Inputs of salts, agrochemicals and chemical contaminants
	Salinization of water
	Hazardous material & liquid disposal from tractors and motors
	Waste disposal
Soil degradation	Soil erosion and sedimentation through run-off
	Waterlogging
	Salinization of soil
Heritage and Archaeological Resources	Removal and/or disturbance
Socio-Economic	Operational Health and Safety around heavy vehicle equipment
Visual impact	

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#### 7.4.1 Loss of Biodiversity and Habitat Destruction

It can be assumed that a 100 ha orchard, which is typically industrialized, will **reduce biodiversity**, because the natural species will essentially be replaced with a homogenous tree species. Monocrops have the potential to **disrupt the ecosystem** as it leaves little room for other plant or animal life. Monoculture, intensive crop production may also create favourable environment for **pest and diseases** to move in.

It is advised to undertake the orchard development in the arid *Southern Kalahari* biome with an holistic, organic agriculture approach. More biodiversity may actually protect crops from disease, because different plants and animals can limit the spread and naturally reduce pests as part of the food chain. An organic agriculture approach should focus on responsible water use, recovering topsoil health with natural compost and encouraging more biodiversity by restoring undergrowth vegetation. It is also advised that existing clusters (islands) of natural mature trees be left intact.

##### 7.4.1.1 Flora

**Protected tree species** identified on site are Camelthorn (*Acacia erioloba*) and Shepherd's tree (*Boscia albitrunca*). These are protected under the Forestry Act No. 12 of 2001 and a permit from the Ministry of Environment, Forestry and Tourism is required to remove any of these. It is highly recommended that no mature, protected or indigenous trees be removed during orchard development. These trees play an important role in the natural ecosystem of the Auob River Valley and Southern Kalahari.

If removal of protected species is inevitable, these trees must be replaced nearby. This can be done by simply germinating seeds gathered from existing trees and planting them under suitable conditions. They are well adapted to the area and should establish well during the following rainy seasons. Replacement can also be undertaken in conjunction with a local nursery or in consultation with the National Botanical Research Institute of Namibia.

On the other hand, any alien invasive plants, such as *Prosopis* trees, that are encountered must be removed aggressively to prevent re-establishment. *Prosopis* trees take over large areas of a river basin or habitat at the expense of local vegetation to the detriment of the ecosystem. This would not only indicate environmental commitment, but actively contribute to a better ecology and watershed management.

**Trenching** to lay pipes, develop tracks and plant trees should be minimised. Existing tracks should be re-used where possible to protect natural vegetation. A strip of 1 m wide on both sides of a tree, within the planting row, can be cleared of vegetation/weeds. The vegetation in the working row should, however, remain, but can be kept short. The presence of the natural vegetation in the working row has certain advantages. It will prevent soil compaction, reduce soil erosion, will enhance water infiltration and it harbours beneficial insects and other biological control agents which are necessary in the orchards.

The accumulation of **dust** particles, caused by trenching and heavy vehicle movement, and the formation of a cementitious layer on plant leaves, may affect photosynthesis, respiration and

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transpiration of some flora species. Leaves covered with dust receive less light for photosynthesis; which interferes with gas exchange between the leaf and air. Dust created during earthworks must be kept to a minimum and dust suppression should be undertaken if necessary. Accumulated dust will be washed off naturally during the following rainy season.

Table 7.4-1 below presents the comprehensive assessment outcome.

**Table 7.4-1: Impact assessment pertaining to loss of biodiversity and habitat destruction - flora**

CRITERIA	DESCRIPTION
Risk Event	<b>Loss of Biodiversity and Habitat Destruction - Flora</b>
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	<p>Avoid the removal and/or damaging of established, mature trees and/or protected flora occurring in the Project Site – e.g. <i>Acacia erioloba</i>, <i>Boscia albitrunca</i>, etc.;</p> <p>If protected species must be removed, obtain a permit from MEFT;</p> <p>Replace damaged/removed protected species in suitable conditions;</p> <p>Remove all invasive alien species on site – e.g. <i>Prosopis spp.</i>;</p> <p>Avoid introducing ornamental plants should windbreaks/landscaping be attempted, especially potential invasive alien species, but rather use localised indigenous species, which would also require less maintenance and water;</p> <p>Make use of existing tracks/roads as much as possible;</p> <p>Do not drive randomly throughout the area (could cause damage to unique flora, cause accidental fires or erosion related problems);</p> <p>Ensure that adequate firefighting equipment (e.g. fire beaters; extinguishers, etc.) is available;</p> <p>Implement dust control when excessive dust is caused;</p> <p>Leave ground cover vegetation like natural grasses to promote soil health and help reduce wind erosion of cleared orchards.</p> <p>Planting must occur shortly after vegetation clearance, to prevent open</p>

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CRITERIA	DESCRIPTION
	ground lying fallow.
Significance (with mitigation)	Low
Confidence level	High
Legal Implications	Forest Act No. 12 of 2001, as amended Nature Conservation Ordinance No. 4 of 1975, as amended

The findings of the Ecological study were that the proposed vegetation clearance of 100 ha on the plateau in the inter-dune street is not expected to impact the *Southern Kalahari* biome as a whole, but will have a **moderate impact** on the close ecosystem. With the mentioned mitigation measures suggested in this section and in Table 7.4-1, the impact can be reduced to **low**.

#### 7.4.1.2 Fauna

The development of the orchards is envisaged on the plateau adjacent to the Auob River Valley, and although overall terrestrial diversity and endemism is low in the *Southern Kalahari*, this ephemeral riverbed can be seen as providing special habitat of significance. The availability of artesian water from the SAB provide habitat for taller, indigenous tree species, which in turn, provide suitable habitat that harbour significant fauna species. Outcrops fringing this valley can also be seen as habitat areas of significance.

Species most likely to be affected by habitat destruction during orchard development are **birds of prey** such as White backed-, Lappet-faced- and White headed vultures that nests in the canopies of high trees such as *Acacia erioloba*. As well as Bateleurs, Black-, Tawny- and Martial eagles that nests in higher trees, outcrop and cliff areas. Kori bustards, Secretary birds, Black storks and Marabou are also vulnerable species that settle near ephemeral rivers in savannah grassland.

Other species to be affected by habitat destruction and pesticides are **reptiles** of which a number are listed as species of concern. Please refer to Section 5.3.2 and Appendix E for the list of these species.

The nearby Hardap Nature Reserve approximately 60 km to the west of the Project Site provide safe habitat for the mentioned species.

**Herbicides and pesticides** have the potential to affect not only the target group, but also poses spill over effects on the ecosystem and may cause mortality in secondary consumers where invertebrate organisms are a food source for a large number of vertebrates. Knowledge and implementation of Integrated Pest Management (IPM) would be required to address possible pest and diseases immediately when detected. Refer to Table 7.4-2 for the impact assessment.



**Table 7.4-2: Impact assessment pertaining to loss of biodiversity and habitat destruction - fauna**

CRITERIA	DESCRIPTION
Risk Event	<b>Loss of Biodiversity and Habitat Destruction - Fauna</b>
Nature of Impact	Negative
Extent	Local
Duration	Medium
Intensity	Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	<p>Select storage site and other temporary lay over sites for fertilisers and produce at the nearby homestead to avoid unnecessary damage to habitat and to make the footprint of damage as small as possible;</p> <p>Provide proper ablution for workers to avoid faecal pollution around irrigation fields;</p> <p>Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios – e.g. baboon, black-backed jackal, crows, etc.;</p> <p>Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna);</p> <p>Avoid off-road driving at night as this increases mortalities of nocturnal species;</p> <p>Avoid and/or limit the use of lights during nocturnal exploration activities as this could influence and/or affect various nocturnal species – e.g. bats and owls, etc. Use focused lighting for least effect;</p> <p>Prevent the killing of species viewed as dangerous – e.g. various snakes;</p> <p>Prevent the setting of snares for ungulates (i.e. poaching), collection of veld foods (e.g. tortoises, chameleon, etc.) and or any form of illegal hunting activities;</p> <p>Implement and maintain off-road track discipline with maximum speed limits (e.g. 40km/h) as this would result in fewer faunal mortalities and limit dust pollution;</p> <p>Implement a Pest Monitoring System and Integrated Pest Management that blends all available management techniques and using less</p>

CRITERIA	DESCRIPTION
	chemical / more non-chemical into one strategy;  If necessary, apply herbicides/pesticides through the drip irrigation system to prevent runoff of fertilizers into ground water;  Use pesticides only when pest damage exceeds an economic threshold;  Use bio-degradable and environmentally acceptable chemicals as far as possible;  Use herbicides/pesticides with low toxicity outside target groups, with short half-lives and high levels of absorption;  Do not apply herbicides/pesticides on windy days to prevent overspray into adjacent indigenous habitats.
Significance (with mitigation)	Low
Confidence level	High
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended

The impact associated with habitat destruction and loss of biodiversity caused by orchards on fauna species are estimated to be **moderate**. With mitigation measures suggested in this section and Table 7.3-2 it is expected to be of **low** significance.

#### 7.4.2 Groundwater Reduction

Groundwater **over abstraction** can be defined as abstracting more than the natural inflow/recharge to the aquifer, thus groundwater outflow is greater than groundwater inflow. Over-abstraction may lead to deepening of water levels which may cause a reduction of the pressure in the aquifer. In terms of direct groundwater-related impacts, over abstraction may result in any, or all, of the following:

- Groundwater level drawdown and subsequent deepening of the water table;
- Changes in groundwater flow patterns that can affect groundwater quality distribution in the subsurface;
- Reduced borehole yields;
- Increased pumping heads;
- Longer borehole recovery periods;
- Non-flowing conditions developing in currently flowing artesian boreholes.

Since *in situ* groundwater is an invisible source, sustainable exploiting thereof can only be observed through monitoring groundwater rest levels in conjunction with monitoring abstraction volumes and -rates. Unless a groundwater balance is established, thus providing an accurate estimation of the surplus volume of groundwater available for abstraction, managing groundwater’s sustainable use is reactionary, i.e., one will only realise over abstraction occurs once the rest water

levels start deepening. Refer to Appendix D, Table 3 for depth-related information on the boreholes on the Remainder of Farm Sponholz No. 140, including the rest water levels, measured during the August 2022 down-hole camera inspections. These levels can be used as baseline information to monitor groundwater level for this Project.

The Geohydrological Assessment could not predict the impact that the increase groundwater abstraction will have on the SAB. The need for a Strategic Environmental Assessment on the impact of irrigation development and increase groundwater abstraction from the SAB became evident during this study to determine the cumulative effect of all the recent developing irrigation schemes.

Improvements in groundwater management and monitoring of the SAB by stakeholders on the Namibian side must be better implemented and intensified in order to acquire reliable data as a basis for development decisions. This should be undertaken by the Stampriet Basin Water Committee (SBWC) and the Ministry of Agriculture, Water and Land Reform (MAWLR). The successful implementation, operation and management of the SBWC could not be determined during this study. All potential impacts identified in this study on groundwater and soil as well as other impacts that might arise during implementation need to be properly identified in time and addressed in an effective manner.

During the public participation of the scoping exercise, several concerns were raised regarding the impact that the substantial increase in groundwater abstraction might have on groundwater levels as well as on the artesian boreholes of downstream properties. It was suggested that a cautious approach be undertaken whereby a gradual and monitored increase in groundwater abstraction be undertaken over a period of 2-5 years to the maximum of the standard quota of 199 000 m<sup>3</sup>/a.

It is thus recommended that a phased approach be undertaken to the orchard development and increased groundwater abstraction. If orchard development takes place by developing 20 ha per year over a period of five years, it will allow the Proponent to assess the feasibility of the proposed cultivations and the SBWC and MAWF to determine the impact of the increased abstraction on groundwater levels and properties downstream of the orchard development.

It is further recommended that the orchard should be developed with olive trees, rather than almond trees. Almond trees are best suited to Mediterranean climate and have high water and nutrition requirements. Olives are more drought resistant and can withstand heat of 40 °C and cold up to - 5 °C. Olive trees are less sensitive to wind damage, more resistant to saline conditions and can be grown on marginal soils. Almond trees should be planted at this stage for experimental purposes only to test the suitability of the cultivar.

Table 7.4-3 below presents the comprehensive assessment outcome.

**Table 7.4-3: Impact assessment pertaining to Groundwater Reduction**

CRITERIA	DESCRIPTION
Risk Event	<b>Groundwater Reduction</b>

CRITERIA	DESCRIPTION
Nature of Impact	Negative
Extent	Regional
Duration	Short, Medium or Long
Intensity	Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	<p>Undertake orchard development with olive trees as cultivar;</p> <p>Undertake a phased approach to the orchard development and increased groundwater abstraction by developing 20 ha per year over a five year period;</p> <p>A groundwater monitoring program on the Project Site must be implemented by the Proponent, whereby water levels and abstraction volumes and rates are measured and recorded frequently;</p> <p>A groundwater monitoring program on the SAB must be implemented by the SBWC and MAWRD whereby water levels and abstraction volumes and rates are monitored;</p> <p>The Stampriet Basin Water Committee must be re-appointed and activated;</p> <p>Manage demand and abstraction (reduce abstraction if over abstraction becomes evident);</p> <p>Implement water conservation measures.</p>
Significance (with mitigation)	Medium to Low
Confidence level	Medium
Legal Implications	<p>Water Act, Act 54 of 1956</p> <p>Water Resource Management Act No. 11 of 2013 (not effected as yet)</p>

According to the Geohydrology study there is a **medium to low** significance of negative impacts being caused by over-exploitation (over-pumping) on the groundwater environment if the monitoring mitigation measures are in place and adhered to.

### 7.4.3 Ground Water Pollution

**Groundwater pollution** can be defined as the direct or indirect alteration of the physical, chemical or biological properties of a water resource. Considering that Namibia is an arid country, which is dependent on limited ground- and surface water, pollution control of this scarce natural resource plays a major role in the country's legislation. Pollution of groundwater by mismanagement has

widespread and long term impacts which must be avoided. During this Project groundwater may become polluted through:

- point source and/or diffuse discharges such as leakage of poorer quality water into the artesian aquifer;
- leakage of salts, agrochemicals and chemical contaminants through over administration of fertilizers, herbicides and pesticides;
- fuel or hazardous substances spills from heavy machinery used during ploughing and/or harvesting.

As pollution products migrate through the soil, small amounts thereof can be retained by soil particles, known as residual saturation, which can potentially reside in the soil for years and act as a continuing source of contamination. Environmental waste protection protocols must be implemented to ensure that no environmental harm is caused and that appropriate action is taken in any event of a point source and/or diffuse discharges occurring.

The water quality in the SAB changes from fresh to very saline over short distances, both laterally and vertically. Iron bacteria seem to be present localised within the soil as well as the groundwater.

During the public participation of the scoping exercise, concern for groundwater pollution was raised by NamWater due to their Gochas Water Supply Scheme approximately 19 km downstream of the Project Site.

The findings of the Geohydrology Study suggest that an increased groundwater flow towards the two boreholes (WW364 and WW31758) will most likely lead to collapse. It is therefore strongly suggested that, should the increased abstraction be undertaken, these two boreholes be replaced.

It is important that the boreholes must be sealed-off properly, otherwise these holes may lead to upper Kalahari water (often of poorer quality) to leak into the borehole, and/or artesian water may leak into the Kalahari aquifer. The latter is of greater concern.

**Table 7.4-4:** Impact assessment pertaining to Groundwater Pollution

CRITERIA	DESCRIPTION
Risk Event	<b>Groundwater Pollution</b>
Nature of Impact	Negative
Extent	Local
Duration	Medium or Long
Intensity	Medium
Probability	Probable

CRITERIA	DESCRIPTION
Significance (no mitigation)	Moderate
Mitigation	<p>Replace and Monitor boreholes that will be used for irrigation purposes.</p> <p>Implement new agronomic farm management technology (such as CropX) to monitor soil moisture and prevent run-off water that might pollute groundwater.</p> <p>To limit the potential for waste generation and its resultant potential impact on the water quality, the following mitigation measures should be implemented:</p> <ul style="list-style-type: none"> <li>• Appropriate measures should be taken for the transportation, handling, storage and disposal of ALL waste and hazardous material.</li> <li>• Adapt cultivation practises (including fertilisation, herbicides and pesticides use) to reduce application of potential pollutants.</li> <li>• Reduce volumes/intensity of irrigation water to minimise leaching of pollutants.</li> <li>• Fertilisation must be done taking cognisance of the fact that over-fertilisation can lead to leaching of chemicals into the groundwater environment.</li> </ul> <p>To limit the potential for spills or leaks from machinery and its resultant potential impact on the water quality, the following mitigation measures should be implemented:</p> <ul style="list-style-type: none"> <li>• All reasonable measures must be taken to prevent spillage and leakage of materials likely to pollute the aquifer(s).</li> <li>• If a spill (especially of hydro-carbons) occurs, the contaminated soil must be removed immediately and disposed of at an appropriate disposal site. Polluted soil must be remediated where possible.</li> </ul>
Significance (with mitigation)	Low
Confidence level	Medium
Legal Implications	<p>Water Act, Act 54 of 1956</p> <p>Water Resource Management Act No. 11 of 2013 (not effected as yet)</p>

According to the Geohydrological Study there is a **low to medium** probability of negative impacts on groundwater quality caused by the irrigation activities.

Considering the thick, impervious Rietmond Member overlaying the Stampriet Artesian Aquifer, spillages of hazardous pollutants such as hydrocarbons from fuel or oil spillages will most likely have very little, if any all, impact on the artesian aquifer.

However, should a hazardous substances enter any of the boreholes, the impacts could be severe, extent locally and be of **high** significance.

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#### 7.4.4 Soil degradation

Soil plays a major role in successful crop production. It provides the medium for trees' stabilisation and root growth and the ecosystem service of nutrient cycling through the transformation of organic materials by soil organisms as well as the retention and release of nutrients. It further regulates the supply and quality of water by controlling water infiltration and percolation, drainage of excess soil water to groundwater, filtering, buffering and transformation of substances and contaminants in water.

##### 7.4.4.1 Soil Composition

Namibian soils naturally suffer from low organic matter content, due to low plant biomass production under the prevailing arid and semi-arid conditions, as well as rapid mineralisation of organic matter at high soil temperatures.

Soil organic matter and nutrients are further lost when vegetation is cleared and removed from land and when agriculture is practiced on marginal land without sufficient inputs of fertilisers, manure, crop residues or compost.

Soil biodiversity suffers from the loss of organic matter, which forms the basis of soil food webs. Overuse of agrochemicals further disrupts soil biotic communities and their breakdown negatively affects the ecosystem services provided by soil.

The *Flavisols* soils along the valley of river the Auob River have the potential to provide nutrient-rich soils for crop cultivation.

The *Calcisols* that occur in the linear inter-dune valleys, generally contain sufficient basic plant nutrients, but the imbalance between the bases suppresses uptake of some of these nutrients by plant roots. The natural vegetation has adapted to local soil conditions, but commercial crops perform poorly in these marginal soils and this is reflected in low crop yields.

It is thus important that soil samples are taken and analysed in order to properly prepare soil before planting. A soil analysis will determine the water-holding capacity, the nutrient content of the soil and how much fertiliser should be applied to ensure optimum production.

A soil feeding programme will then be required, based on the soil contents and the developmental phases of the trees, to ensure they receive the right volumes of nutrients at the right time.

Fertilisers are required to ensure the trees have access to enough macro- and microelements for optimal production, especially during the first three years after planting to get them into production earlier. It would be beneficial to use organic mulches such as kraal manure or decomposed wood sawdust. Refer to Section 4.3.3.

##### 7.4.4.2 Soil Salinisation

High levels of salt are toxic to plants and causes water stress by hampering uptake of water, even when the actual volume of water in the soil is sufficient. All irrigation water contains some salts, that accumulate in soil over time. Poor drainage conditions, low rainfall and excessive irrigation all

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contribute to the build-up of salts. Large parts of the Hardap Irrigation Scheme experience management-related salinisation. Rehabilitation of saline soils comprise the following:

- irrigation methods that deliver less water directly to plant roots and not raise the water table;
- installing sub-surface drainage systems;
- lowering the groundwater table by growing deep-rooted salt-tolerant crops;
- occasionally flushing the salts beyond the root zone with copious amounts of clean water.

#### **7.4.4.3 Soil Compaction**

Repeated pressure on the soil surface, such as from heavy agricultural machinery and trampling by grazing animals, especially when the soil is wet, as well as ploughing to a constant depth, break down soil aggregates and compact the soil to form a subsurface 'hardpan' that has very low porosity and permeability. As macropores collapse and become disconnected, the flow of water and air is impeded, thus compaction interferes with aeration, water infiltration, percolation and storage, nutrient uptake, root growth and biological activity.

Topsoil compaction is partly reversible and controllable, but subsoil compaction is cumulative and not completely reversible, as pore function cannot be fully restored. Deep ripping can break up the cement-like hardpan, while adding organic matter, planting deep-rooted trees and using tined tillage instruments, rather than traditional mouldboard ploughs, can help prevent and alleviate compaction.

#### **7.4.4.4 Soil Pollution**

Soil pollution refers to accumulation of organic toxins following planting of certain crops, accumulation of excess agro-chemicals (especially pesticides and herbicides), and nutrient imbalances and toxicities arising from using inappropriate types and quantities of fertilisers.

#### **7.4.4.5 Soil Acidification**

The sandy Arenosols of eastern and north-eastern Namibia have little capacity to hold water or nutrients. The low cation exchange capacity and sandy texture mean that basic cations (calcium, magnesium, potassium, sodium) are easily leached out beyond the reach of plant roots. They are also somewhat acidic. Under intensive crop production, such soils quickly become more acidic through addition of ammonium-based fertilisers and, to a lesser extent, phosphorus and sulphur fertilisers.

Harvesting of crops and removal of their residues effectively takes basic cations out of the system and promote acidification. The problem can be corrected by working agricultural lime into the soil before planting, return of crop residues to the soil, and applying fertilisers in small increments throughout the growing season. Avoid ammonium-based fertilisers to limit further acidification.

For successful crop farming, both water and fertilisers (preferably organic) must be applied to these soils as close to the plant roots as possible, for example using drippers, adding fertilisers to irrigation water and applying fertilisers in small doses spaced out through the growing season.



**Table 7.4-5: Impact assessment pertaining to Soil Degradation**

CRITERIA	DESCRIPTION
Risk Event	<b>Soil Degradation</b>
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	<p>Deep ripping is required to break up the cement-like hardpan if/where it occurs.</p> <p>Use tined tillage instruments to prevent and alleviate compaction.</p> <p>Add organic matter to the orchards.</p> <p>Work agricultural lime into the soil before planting.</p> <p>Apply organic fertilisers in small increments throughout the growing season.</p> <p>Avoid ammonium-based fertilisers to limit acidification.</p> <p>Drip or trickle irrigation with small applications of fertilisers must be spaced out through the growing season.</p> <p>Water and fertilisers must be applied as close to the plant roots as possible, for example using drippers, adding fertilisers to irrigation water and applying fertilisers in small doses.</p> <p>Maintaining good vegetation cover and soil organic matter content to protect the soil.</p> <p>Slow down overland flow and enhance infiltration of water into the soil.</p> <p>Do not remove all natural vegetation causing land lying bare. Return crop residues to the soil.</p> <p>Do not overuse agrochemicals since it disrupts soil biotic communities and their breakdown negatively affects the ecosystem services provided by soil.</p> <p>Wind erosion can be minimised by retaining vegetative cover in the form of natural vegetation and mulches to break wind speed at ground level and by planting windbreaks.</p>

CRITERIA	DESCRIPTION
Significance (with mitigation)	Low
Confidence level	High
Legal Implications	Soil Conservation Act No. 76 of 1969, as amended

Soil degradation can have a **moderate** impact on the sensitive soil composition of Namibia, but with proper soil monitoring and management it can be reduced to **low** significance.

#### 7.4.5 Heritage and Archaeological Resources

No signs of archaeological remains exist on the 100 ha set aside for orchard development. In the event that buried archaeological remains are detected, which are not visible to surface survey, it must be handled in accordance with the provisions of Part V Section 46 of the National Heritage Act (27 of 2004). The “chance finds” procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person. This process involves the following:

##### Responsibility:

Labourers	To exercise due caution if archaeological remains are found.
Foreman	To secure site and advise management timeously.
Proponent	To determine safe working boundary and request inspection.
Archaeologist	To inspect, identify, advise management, and recover remains.

##### Procedure:

Action by person identifying archaeological or heritage material:

- If operating machinery or equipment, stop work.
- Identify the site with flag tape.
- Determine GPS position if possible.
- Report findings to an archaeologist.

**Table 7.4-6:** Impact assessment pertaining to Heritage and Archaeological Resources

CRITERIA	DESCRIPTION
Risk Event	<b>Heritage and Archaeological Resources</b>
Nature of Impact	Neutral
Extent	Site specific

CRITERIA	DESCRIPTION
Duration	Medium
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	<p>Caution should be exercised if archaeological/heritage remains are discovered during ploughing or tillage.</p> <p>The labourers should receive training with respect to the identification of archaeological/heritage remains and the procedures to follow should such remains be discovered during construction.</p> <p>Any archaeological materials found should be reported to the National Monuments Council, and all on-site activities stopped immediately. Details with regards to the procedure to follow is defined in the EMP</p>
Significance (with mitigation)	None
Confidence level	High
Legal Implications	National Heritage Act (Act 27 of 2004), as amended

The probability of locating important archaeological/heritage remains is unlikely. The impact rating associated with such an event is therefore considered to be **low** before mitigation and **none** after mitigation.

#### 7.4.6 Natural Resources (water & energy)

Irrigation through a drip system require water and energy of which water is currently the source under pressure. The impact on groundwater abstraction is addressed in Section 7.4.2.

Irrigation will be administrated through a drip system consisting of a micro-irrigation that slowly drip water to the roots of plants, either from above the soil surface or buried below. It has the potential to save water and nutrients since it applies the right size water drop at the right tempo to ensure the most efficient way to irrigate the trees.

Solar radiation and sunshine in the Project Area is sufficient to be able to supplement NamPower electricity with low carbon solar energy from solar panels.

**Table 7.4-7:** Impact assessment pertaining to Natural Resources (Water and Energy)

CRITERIA	DESCRIPTION
Risk Event	<b>Natural Resources (Water and Energy)</b>
Nature of Impact	Negative
Extent	Regional

CRITERIA	DESCRIPTION
Duration	Medium
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	<p>Irrigation should be done at appropriate times during the day/night when least evaporation will take place.</p> <p>Appropriate amount of water-use must be determined for irrigation to prevent plant withering or unnecessary run-off water.</p> <p>Day to day leakage checks must be done.</p> <p>There should be no tolerance towards water wastage.</p> <p>Electricity from NamPower can be supplemented by solar energy if possible.</p>
Significance (with mitigation)	Low to None
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended

Appropriate mitigation measures can be implemented to prevent a **low** significant water and energy waste to **none**.

#### 7.4.7 Socio-Economic

Positive Socio-Economic impacts are listed in Chapter 4.5 and 7.1.1. Negative socio-economic impacts associated with the orchard development are:

##### 7.4.7.1 Health & Safety

Operation of heavy vehicles and machinery has the potential for accidental injury, either minor or major accidents, to labourers. On-site safety of all personnel is an important responsibility of the Proponent and should be adhered to in accordance with the requirements of the Labour Act (No 11 of 2007) and the Public Health Act (No. 36 of 1919). Ensuring that the operational activities do not pose any danger to the surrounding community is important.

**Table 7.4-8:** Impact assessment pertaining to health and security

CRITERIA	DESCRIPTION
Risk event	<b>Health, Safety and Security</b>
Nature of Impact	Negative
Extent	On Site
Duration	Very short

CRITERIA	DESCRIPTION
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	<p>Ensure that all labourers and personnel are trained depending on the nature of their work.</p> <p>Provide for a first aid kit and trained person to apply first aid when necessary.</p> <p>Restrict unauthorised access to the orchard.</p> <p>Clearly demarcate dangerous areas and no-go areas on site.</p> <p>The Proponent must comply with all applicable occupational health and safety requirements.</p> <p>The workforce should be provided with necessary Personal Protective Equipment.</p>
Significance (with mitigation)	Low-none
Confidence level	High
Legal Implications	Labour Act (No 11 of 2007) and the Public Health Act (No. 36 of 1919)

These potential impacts hold **low** significance and with appropriate Health and Safety mitigations can be reduced to **low** or hopefully **none**.

#### 7.4.8 Visual Aesthetics and Sense of Place

The extent to which the proposed Project will have an effect on the visual aesthetics and/or sense of place is determined by the (i) the area/distance between the site and the receptor; (ii) larger topography; (iii) density and type of vegetation on-site and in between the site and the receptor; and (iv) the nature and scale of the development.

Olive trees can grow to a height of 5-7 m (see Photo 7.4-1) and an olive orchard will not necessarily have a negative visual impact.



**Photo 7.4-1** – View of an olive orchard

The 100 ha orchard is envisaged in the first inter-dune street on the plateau flanking the Auob River Valley (refer to Fig. 4.4-1 in Section 4).

Photo 7.4-2 below shows the M33 main road in the lower right corner and the plateau on which the orchard is planned, on the top left corner.

**Photo 7.4-2** – View of the Auob Valley and adjacent plateau

Given the elevation of the plateau above the M33 running along the Auob River Valley and the distance from the plateau rand to the orchard, it can be predicted that the orchard will not be visible for passers-by on the road between Stampriet and Gochas.

Due to the height of the trees, it might be visible from viewpoints on the Remainder of Farm Sponholz No. 140 and possibly on neighbouring farms. But the longitudinal dunes hide trees as high as camelthorn trees from one inter-dune street to another, so this should be the case with the orchard trees in one of these streets.

**Table 7.4-9: Impact assessment pertaining to visual aesthetics and sense of place**

CRITERIA	DESCRIPTION
Risk event	<b>Visual aesthetics and sense of place</b>
Nature of Impact	Negative, Neutral or Positive
Extent	Local
Duration	Permanent
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	The topography of the Auob Valley and adjacent plateau on which the orchard is envisaged as well as the distance between the plateau rand and the Project Site will hide the 100 ha orchard from the M33 main road that runs between Strampriet and Gochas.  Longitudinal dunes will further decrease its visibility from viewpoints on the farm and neighbouring farms on the plateau.
Significance (with mitigation)	Low to None
Confidence level	Medium

The significance of the visual impact and sense of place of the orchard development is expected to be either **positive, neutral** or **low negative** and will remain **low** during project life. Mitigation measures for full rehabilitation exist to reduce the significance of the impact after project life to **none**.

## 7.5 DECOMMISSIONING AND CLOSURE

It is the understanding that every Project should have a Project Life, after which rehabilitation to its natural pristine condition should take place. In the case of this Project it is envisaged to be at least 25-30 years before olive and almond tree production will decrease. Decommissioning and rehabilitation will be the responsibility of the Proponent. Refer to Section 4.3.5 for the activities to be undertaken during Decommissioning. It should be undertaken according to a Decommissioning & Rehabilitation Plan in consultation with a Botanist or Ecologist to advise on how to go about restoring the area to its pristine condition.

## 7.6 CUMULATIVE IMPACTS

Any development introduced is expected to place an additional load on existing natural resources and infrastructure and have both positive and negative impacts on the immediate and surrounding environment (natural and social).

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The significance thereof is determined by the nature and the scale of the proposed development. An evaluation of the identified impacts that the proposed orchard development may have on the environment (i.e. natural and social) suggests that it will have a certain potential impact, should none of the mitigations be implemented.

The increase of water abstraction from the Stampriet Artesian Basin will have a cumulative impact on **groundwater reduction and pollution**. The low inherent fertility and composition of Namibian **soils** add a further cumulative impact due to irrigation development.

The SAB may be negatively affected according to climate change projections for eastern Namibia, and currently some cross-border studies are being planned to assess the long-term viability of this aquifer (*Alker, 2007*). Given the scope of orchard expansion on the Remainder of Farm Sponholz No. 140, it has the potential to have a **moderate** impact on groundwater reduction and pollution, but with implementing mitigation measures discussed in Section 7.4.2 and 7.4.3 and rigorous monitoring it can be reduced to **low**.

Cumulative unmitigated impact of **biodiversity loss** and use of **pesticides and herbicides** can be significant. Although the direct impacts may occur within the Project Site only, the project could contribute to the cumulative impact of the irrigation developments along the SAB. Without mitigation the probability associated with the impacts are **moderate**. With mitigation measures discussed in Section 7.4.1 the probability can be reduced to **low**.

The cumulative impact of the orchard expansion development, given its footprint of 100 ha in a sensitive arid area, can be expected to be **moderate**. With the suggested mitigation measures and meticulous water and soil monitoring by appropriate persons, it can be reduced to **low** or **none** if adequate recharge and soil preparation takes place.

The need for a Strategic Environmental Assessment on the impact of irrigation development and increase groundwater abstraction from the SAB became evident during this study to determine the cumulative effect of all the recent developing irrigation schemes.

## 8 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 have been drawn from the assessment outcome, as presented in Chapter 7.

### 8.1 CONCLUSIONS

It is the conclusion of the Environmental Scoping Assessment that this project has the potential to contribute positively to the country's food security in a manner that compliments the Namibia Agriculture Policy 2015. However, Namibia's arid and unpredictable climate, limited water sources, soils with inherently low fertility and poor physical properties are major constraints to limit agricultural development. Compared to crop farming in more fertile parts of the world, the vast



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majority of Namibian soils are considered as marginal. Natural vegetation is adapted to local soil conditions, but crops perform poorly in these marginal soils and this is reflected in low yields.

That said, the scoping study indicated that the soil type of the Auob River Valley and interdune valleys that occur in the Project area have the potential to overcome the general difficulties experienced in crop farming in other areas of Namibia. The availability of groundwater throughout the year from the SAB, further enhances agronomic potential of the Project. Commercial high-input farming technologies exist and can help overcome general limitations, but extensive capital investment will be required to overcome the environmental constraints.

The Geohydrological Assessment for this Project could not predict the impact that the increased groundwater abstraction will have on the SAB, but determined baseline parameters for the Project Site from which monitoring can be undertaken.

With the mitigation measures as discussed in Chapter 7.4, the Project can minimize negative environmental impacts and with rigorous monitoring of groundwater quantity and quality by the Proponent, the Stampriet Water Basin Committee and the Ministry of Agriculture, Water and Land Reform, impacts on groundwater of the SAB can be detected and addressed.

## 8.2 RECOMMENDATIONS

Given the above it is recommended that orchard development and increased groundwater abstraction from the SAB on the Remainder of Farm Sponholz No. 140 be done in a phased approach with development of 20 ha of olive trees per year and subsequent increase in groundwater abstraction over 5 years. This must be undertaken with rigorous monitoring of groundwater, soil and financial feasibility. This will allow the Proponent, SBWC and MAWLR to assess the feasibility of the proposed cultivations and also the influence of the increased abstraction on properties downstream over a period of 5 years. Also refer to Section 7.4.2.

It is the opinion of the EAP that further information for this Project will not be revealed by a full EIA, but can only be obtained during the increase groundwater abstraction and crop production and therefore proper monitoring measures must be put in place before an ECC is granted.

This study could not confirm the successful implementation and operation of the Stampriet Water Basin Committee and it is recommended that the MAWLR re-address this institutional body.

This environmental scoping assessment recommends that the intended project should proceed with caution under the following recommendations:

1. All required permits, licenses and approvals (see section 3.4) for the development be obtained.
2. All potential impacts identified in this study on groundwater and soil as well as other impacts that might arise during implementation must be properly identified in time and addressed in an effective manner.

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3. All mitigations listed in Tables 7.4-1 to 7.4-9 and the Environmental Management Plan (Appendix G) be implemented prior and during crop production.
  4. Continued on-site monitoring of groundwater levels, quality and soil must be undertaken by the Proponent and the Stampriet Water Basin Committee as well as monitoring of the SAB as a whole should be undertaken by the MAWLR.
  5. Monitoring Programmes must be implemented to address the uncertainties around identified impacts.
  6. Timeous management practices must be put in place if any detrimental impacts are detected.

### **8.3 ENVIRONMENTAL STATEMENT**

Based on the information presented in this scoping report, the Environmental Assessment Practitioner is of the opinion that the immediate and larger environment will not be significantly impacted if the above recommendations as proposed in this report are implemented and monitored, and responsible environmental practises are applied by the Proponent.

Urban Green cc, the independent environmental assessment practitioner, recommends to the relevant authorities that the application for the listed activities associated with the increase in water abstraction from the SAB on the Remainder of Farm Sponholz No. 140 be approved on condition that the above recommendations (Section 8.2) are met and that continuous monitoring be conducted in accordance with the Environmental Management Act (Act No. 7 of 2007), its EIA Regulations and this scoping report. It is important that proof of monitoring is submitted to the office of the Environmental Commissioner to be used as part of the review process pertaining to the 3-yearly ECC renewal.

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## 9 REFERENCES

- Alker, Marianne (2007)** *The Stampriet Artesian Aquifer Basin - A case study for the research project "Transboundary groundwater management in Africa"* German Development Institute
- Amerasinghe, F. and Boelee, E.** *Assessing the Impact of Irrigation Development on the Environment and Human Health* International Water Management Institute (IWMI), Addis Ababa, Ethiopia
- Apps, P (2000)** *Smither's Mammals of Southern Africa – A Field Guide* Struik Cape Town
- Atlas of Namibia Team (2022)** *Atlas of Namibia: its land, water and life* Namibia Nature Foundation, Windhoek
- Blaum, N, Wasiolka, B., Rossmannith, E. and Jeltsch, F. (2008)** *Spotlight on Agriculture – The Effects of Grazing-induced shrub encroachment on animal diversity in Southern Kalahari Rangelands.* Ministry of Agriculture, Water and Forestry, Windhoek, Namibia
- Branch, B. (1998)** *Field guide to the snakes and other reptiles of southern Africa.* Struik, Cape Town.
- Coetzee, M.E. (2021)** *Notes on the 2021 Soil Map of Namibia Project CS/RFQ/25-2/2017: Agro-Ecological Zone and Carrying Capacity Maps* Ministry of Agriculture, Water and Land Reform Namibia
- Curtis, B. and Mannheimer, C. (2005)** *Tree Atlas of Namibia* National Botanical Research Institute Windhoek
- Department: Agriculture, Forestry and Fisheries (2010)** *Olives – Production guideline* Resource Centre Pretoria, Republic of South Africa
- Mannheimer, C. and Curtis, B. (2018)** *Le Roux and Muller's Field Guide to the Trees & Shrubs of Namibia* Macmillan Education Namibia
- Environmental Protection Agency (2010)** *Environmental Impact Assessment Guidelines for the Agricultural Sector* Ghana Environmental Assessment Capacity Development Programme (GEACAP) and Ghana Environmental Assessment Support Programme (GEASP) Ghana
- Giess, W. (1971)** *A preliminary vegetation map of South West Africa.* Dinteria 4: 1-114.
- Government of Namibia (2017)** *Namibia's Fifth National Development Plan (NDP5)*
- Hilton-Taylor, C. (2000)** *2000 IUCN Red List of Threatened Species.* IUCN, Gland, Switzerland and Cambridge, United Kingdom.
- International Groundwater Resource Assessment Centre (IGRAC)** *Stampriet Aquifer* Unesco International Hydrological Programme and Government of the Netherlands <https://www.un-igrac.org/case-study/stampriet-aquifer>.
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- JICA (2002)** *The Study on the Groundwater Potential Evaluation and Management Plan in the Southeast Kalahari (Stampriet) Artesian Basin in the Republic of Namibia – Final Report* unpublished report prepared for DWAF (Namibia), Japanese International Cooperation Agency Tokyo
- Mendelson J., Jarvis A., and Roberts C., Roberson T., (2002)** *Atlas of Namibia – A Portrait of the Land and its People* Ministry of Environment and Tourism
- Ministry of Environment and Tourism (2012)** *EIA Regulations (GN. No. 30 of 2012)*, Government Gazette, Windhoek, Namibia
- Ministry of Agriculture, Water and Forestry (2015)** *National Agriculture Policy 2015* Republic of Namibia
- Namibia Statistics Agency (2012)** *Namibia Housing and Income Expenditure Survey 2009/2010*
- Office of the Prime Minister (2007)** *Environmental Management Act, 2007 (No. 7 of 2007) and its Regulations*. Windhoek: Government Gazette, Windhoek, Namibia
- Parcell, J. (2016)** *A Global Demand Analysis of Vegetable Oils for Food and Industrial Use: A Cross-Country Panel Data Analysis with Spatial Econometrics* Department of Agricultural and Applied Economics, University of Missouri, Columbia
- Sinclair, I., Hockey, P. and Tarboton, W. (2002)** *Sasol Birds of Southern Africa* Struik Publishers Cape Town
- Stone, A. and Edmunds, W. (2011)** *Sand, salt and water in the Stampriet Basin, Namibia: Calculating unsaturated zone (Kalahari dunefield) recharge using the chloride mass balance approach* Oxford Water Futures Programme School of Geography and the Environment, University of Oxford, UK
- Treeby, Michael (2018)** *Managing Almond Trees with less Water* Horticulture Industry Networks Victoria
- Van Oudtshoorn, F. (1999)** *Guide to Grasses of Southern Africa* Briza Publishers Pretoria South Africa
- Van Vuuren, O. (2022)** *Baseline Report on the Geohydrology – To Obtain an Environmental Clearance Certificate for Irrigation purposes on Farm Sponholz No. 140 near Stampriet* Dynamic Water Resource Management Windhoek Namibia
- [www.africabizplans.com/free-business-ideas/how-to-start-an-almond-farm-in-africa](http://www.africabizplans.com/free-business-ideas/how-to-start-an-almond-farm-in-africa)** *Let's Plan your Almond Farm Business in Africa – The most comprehensive analysis and review of Almonds Farm Opportunities in Africa*
- [www.agrifarming.in/almond-farming-information](http://www.agrifarming.in/almond-farming-information)** *Almond Farming, Planting, Care, Harvesting – A step by step guide of almond farming* Agrifarming
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**APPENDIX A**  
**APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE**

**APPENDIX B**  
**CURRICULUM VITAE ENVIRONMENTAL ASSESSMENT PRACTITIONER**

**APPENDIX C**  
**BOREHOLE CAMERA SURVEY SHEET**

**APPENDIX D**  
**GEOHYDROLOGICAL REPORT**



**APPENDIX E**  
**ECOLOGY FAUNA AND FLORA SPECIES LISTS**

**APPENDIX F**  
**PUBLIC PARTICIPATION**

**APPENDIX G**  
**ENVIRONMENTAL MANAGEMENT PLAN**