

**PROPOSED AGRICULTURAL DEVELOPMENT,
FARMS 1763, 2372 AND 2363,
KAKAMAS SOUTH SETTLEMENT,
KAI! GARIB MUNICIPALITY, NORTHERN CAPE**

FINAL
ENVIRONMENTAL IMPACT ASSESSMENT REPORT



DENC REF: NC/EIA/02/ZFM/DAW/KAK1/2020

AUGUST 2020

VERNEUJK PAN TRUST

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D:E&NC Ref No.: NC/EIA/02/ZFM/DAW/KAK1/2020

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EXECUTIVE SUMMARY

Introduction

It is proposed that up to approximately 195ha of land be considered for additional irrigation on Farms 1763, 2372 and 2363, situated in the Kakamas South Settlement. The development will also include the construction of associated infrastructure for irrigation purposes for the various crops that could be cultivated. Irrigation water will be sourced from the proposed new Kakamas WWTW once constructed and operational.

The site is located approximately 6km west, south-west of the town of Kakamas, in the Kai !Garib Municipality, Northern Cape. The site is surrounded by existing crops (Lucerne and pecan nuts), previously disturbed by ostrich farming and natural undisturbed areas.

The applicant is Verneujk Pan Trust who will undertake the activity should it be approved. EnviroAfrica CC has been appointed as the independent environmental assessment practitioner (EAP) responsible for undertaking the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environment and Nature Conservation (DENC).

Environmental Requirements

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Northern Cape to the Department of Environment and Nature Conservation (DE&NC).

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed agricultural development:

Government Notice R327 (Listing Notice 1) listed activities:

- 12** The development of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
 - (ii) infrastructure or structures with a physical footprint of 100 square metres or more;

where such development occurs;

- (a) within a watercourse;
- (b) in front of a development setback; or
- (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

- 19** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;
- (a) will occur behind a development setback;
 - (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
 - (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.
- 27** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for;
- (i) the undertaking of a linear activity; or
 - (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R325 (Listing notice 2) listed activities:

- 15** The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;
- (i) the undertaking of a linear activity; or
 - (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R324 (Listing notice 3) listed activities:

- 12** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.
- 14** The development of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;
 - (ii) infrastructure or structures with a physical footprint of 10 square metres or more;
- where such development occurs;
- (a) within a watercourse;
 - (b) in front of a development setback; or
 - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;
- Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;

Need and Desirability

The town of Kakamas is in need for a new Wastewater Treatment Works (WWTW), since the existing treatment works does not have sufficient capacity and is aging. The Kai !Garib Municipality has therefore proposed a new Waste Water Treatment Works that will have sufficient capacity to service Kakamas (a separate NEMA Application will be required and will be submitted). The treated effluent would however need to be disposed of, or utilised. One option is to use the treated effluent for irrigation.

The proposed location for the WWTW is on Erf 236, owned by the Verneujk Pan Trust. In agreement with the Kai !Garib Municipality, in exchange, the Verneujk Pan Trust would receive the treated effluent, which would have sufficient volume to irrigate approximately 200ha of crops.

Although exact figures are still to be determined, the proposed development is expected to create significant jobs opportunities during the construction and operational phases, with a majority of the job opportunities going towards previously disadvantaged individuals.

The proposed location is considered to be ideal, as it is in relatively close proximity to the source of water, the proposed Kakamas WWTW (3km). The site is also ideally situated in that its elevation is below that of the proposed Kakamas WWTW, thereby relying more on gravity and not on pump stations. The site is adjacent to existing similar crops (centre pivot irrigation areas, and pecan nuts). The site also has easy access from the N14.

Soil studies conducted also found that the proposed soils were of Medium to High potential for the establishment of perennial crops.

The proposed activity, and site is compatible with the surrounding area. The area, particularly along the Orange River is known for its agriculture and crop production, particularly grape production (wine, table and raisin grapes) although pecan nut, corn and lucerne is also common. The sites are adjacent to existing lucerne and pecan nut crops. Agriculture is a predominant economic sector in the area.

According to the Kai !Garib Municipality Draft IDP (2018/19), the Orange River played an enormous role in the formation of the municipal area and most of the towns and settlements are to be found close to or adjacent thereto. The economy is heavily depended on the Agricultural Sector, both intensive and extensive.

Site Description

The site is located on Farms 1763, 2372 and 2363, situated in the Kakamas South Settlement. The development will also include the construction of associated infrastructure for irrigation purposes and for the various crops that could be cultivated. Irrigation water will be sourced from the proposed new Kakamas WWTW once constructed and operational.

The site is located approximately 6km west, south-west of the town of Kakamas, in the Kai !Garib Municipality, Northern Cape. The site is surrounded by existing crops (Lucerne and pecan nuts), previously disturbed by ostrich farming and natural undisturbed areas.

- Vegetation

The proposed site of the agricultural development is generally undeveloped, fallow and generally near natural. Some proposed areas have been partially disturbed by previous agricultural activities (ostrich and crop farming).

According to the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version) only one broad vegetation type is expected in the proposed area and its immediate vicinity, namely Bushmanland Arid Grassland. The vegetation encountered generally conforms to Bushmanland Arid Grassland.

Three plant communities were encountered namely:

- A sparse (semi-desert type) low shrubland with grasses sometimes present on the open undulating plains
- A denser and higher riparian vegetation was encountered next to the watercourses. The more pronounced these water courses the more established the riparian zone became.
- Sparse woodland dominated by magnificent trees was encountered in the deeper sandy soils next to the Hartbees River.

- Freshwater

There are potentially two watercourses that may be impacted by the proposed development:

- The Hartbees River (located to the east of the development, with some of the proposed development areas on the western bank of the river)
- A number of drainage lines (ephemeral stream) within the area.

The Orange River and the Hartbees River confluence is located approximately 3.3km north of the development site.

A series of pans separate the Sak River from the Hartbees River. The Hartbees River only flows when these pans overflow. This happened in 1999 and in 2010.

The Lower Orange River is flanked by numerous drainage lines, which are mostly dry and only contain water during the occasional thunderstorm. These drainage lines are a part of the arid landscape. The drainage lines only have water during very large rainfall events. Most of the time the drainage lines are dry, for months and even years on end.

Next to the farm road along the Hartbees River, the drainage lines fan out to connect to one another in a broad and continuous fan, interconnected, with no visual demarcation between drainage lines.

- Heritage

According to the Heritage Impact Assessment no significant heritage sites or features were identified within the development footprint.

Alternatives

Alternatives to the proposed development are very limited and have therefore not been considered for the following reasons described below.

There are no feasible site alternatives proposed as the site is located on a property currently owned by the Applicant to be further developed for agriculture. The site is ideally situated due to its proximity and elevation to the proposed Kakamas WWTW, the N14 for access, and the surrounding area is characterised by similar crop production. Soil studies conducted also found that the proposed soils were of Medium to High potential for the establishment of perennial crops.

Although other areas were investigated on the properties, these were not deemed viable either due to:

- Being within drainage lines
- Being on unsuitable soil
- Unsuitable elevation with respect to the proposed Kakamas WWTW requiring additional pump stations.

Activity alternatives (besides agriculture) are also very limited with no feasible alternatives to assess. Agriculture is the most prevalent activity in the surrounding area, with the Applicant already involved in crop production in the area. As discussed earlier, agriculture is also the predominant economic sector in the area, contributing 49% to the formal employment in the Kai !Garib Municipality.

The development was proposed due to the need for the disposal and utilisation of treated effluent from the proposed Kakamas WWTW. Irrigation of crops with the treated water is the most feasible option.

There are therefore no feasible activity alternatives to assess.

The “no-go” option is the option of not developing the area for additional irrigation and crop production. The current status quo will remain. Although this might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not developing the site for crop production will not be realised. The jobs opportunities and expected contribution to the region’s economy would not be realised.

Other means of disposing and/or utilising the treated effluent from the proposed Kakamas WWTW would then need to be investigated.

The no-go option would only be recommended if it were found that the proposed development on this site or in this area might potentially cause substantial detrimental harm to the environment.

Tasks to be undertaken during the EIA Phase

The following tasks must still be undertaken during the EIA phase of the process:

- Compile Draft Environmental Impact Report (EIR) for public comment based on specialist information
- Distribute and/or make the Draft EIR available to registered Interested and Affected Parties for viewing and comment
- Receive comments on Draft EIR. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR).
- Preparation of a FINAL EIR for submission to DENC for consideration and decision-making.

Specialist Studies

The following specialist studies were undertaken as part of this Environmental Impact Assessment:

- Botanical Impact Assessment
- Heritage Impact Assessment
- Freshwater Assessment

Conclusion

The specialist studies and the information provided within the EIA Report, indicates that the proposed agricultural development does not pose any significant impacts and can be implemented with appropriate mitigation.

In terms of the need and desirability of the proposed development, the town of Kakamas is in need for a new Wastewater Treatment Works, since the existing treatment works does not have sufficient capacity and is aging. The Kai !Garib Municipality has therefore proposed a new Waste Water Treatment Works that will have sufficient capacity to service Kakamas. The treated effluent would however need to be disposed of, or utilised. One option is to use the treated effluent for irrigation.

The proposed location for the WWTW is on Erf 236, owned by the Verneujk Pan Trust. In agreement with the Kai !Garib Municipality, in exchange, the Verneujk Pan Trust would receive the treated effluent, which would have sufficient volume to irrigate approximately 200ha of crops.

Although exact figures are still to be determined, the proposed development is expected to create significant jobs opportunities during the construction and operational phases, with a majority of the job opportunities going towards previously disadvantaged individuals.

The proposed location is considered to be ideal, as it is in relatively close proximity to the source of water, the proposed Kakamas WWTW (3km). The site is also ideally situated in that its elevation is below that of the proposed Kakamas WWTW, thereby relying more on gravity and not on pump stations. The site is adjacent to existing similar crops (centre pivot irrigation areas, and pecan nuts). The site also has easy access from the N14.

Soil studies conducted also found that the proposed soils were of Medium to High potential for the establishment of perennial crops.

The proposed activity, and site is compatible with the surrounding area. The area, particularly along the Orange River is known for its agriculture and crop production, particularly grape production (wine, table and raisin grapes) although pecan nut, corn and lucerne is also common. The sites are adjacent to existing lucerne and pecan nut crops. Agriculture is a predominant economic sector in the area.

In terms of alternatives, the proposed site and the activity are the only viable options for the Applicant at this stage, and as such, no further Alternatives were investigated.

The No-Go option is the option of not developing the area for additional irrigation and crop production. The current status quo will remain. Although this might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not developing the site for crop production

will not be realised. The jobs opportunities and expected contribution to the region's economy would not be realised.

Other means of disposing and/or utilising the treated effluent from the proposed Kakamas WWTW would then need to be investigated.

The no-go option would only be recommended if it were found that the proposed development on this site or in this area might potentially cause substantial detrimental harm to the environment.

According to the Botanical Impact Assessment, the proposed development will result in the permanent transformation of approximately 200ha of natural veld to intensive agriculture. According to the impact assessment, with good environmental control, the development is likely to result in a **Medium/Low** impact on the environment.

With the correct mitigation it is considered highly unlikely that the proposed development will contribute significantly to any significant loss of vegetation type and associated habitat, loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities, loss of local biodiversity and threatened plant species and loss of ecosystem connectivity.

Having evaluated the proposed site and its immediate surroundings, it is unlikely that the proposed development will lead to any significant impact on the botanical features as a result of its placement as long as the following impact minimisation recommendations are implemented.

According to the Freshwater Impact Assessment, since impacts are already evident and since a vast amount of money has already been invested in this venture, with many job opportunities at stake, the proposed development should go ahead, but the eminent approval would increase the urgency and pressure for a known and accepted Lower Orange River Drainage Lines conservation policy.

The Heritage Impact Assessment identified no heritage resources that will be impacted on negatively by the proposed development.

Considering all the information, it is not envisaged that this proposed agricultural development will have a significant negative impact on the environment, and the socio-economic benefits are expected to outweigh any negative impacts. The negative impacts can also be mitigated to a satisfactory degree.

It is therefore recommended that the proposed development be supported and be authorised with the necessary conditions of approval, subject to the implementation of the recommended enhancement and mitigation measures contained in Section 12.

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ACRONYMS

BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DENC	Department of Environment and Nature Conservation (Northern Cape)
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
OESA	Other Ecological Support Area
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute

1. INTRODUCTION

1.1 BACKGROUND

It is proposed that up to approximately 195ha of land be considered for additional irrigation on Farms 1763, 2372 and 2363, situated in the Kakamas South Settlement. The development will also include the construction of associated infrastructure for irrigation purposes for the various crops that could be cultivated. Irrigation water will be sourced from the proposed new Kakamas WWTW once constructed and operational.

The site is located approximately 6km west, south-west of the town of Kakamas, in the Kai !Garib Municipality, Northern Cape. The site is surrounded by existing crops (Lucerne and pecan nuts), previously disturbed by ostrich farming and natural undisturbed areas.

The applicant is Verneujk Pan Trust who will undertake the activity should it be approved. EnviroAfrica CC has been appointed as the independent environmental assessment practitioner (EAP) responsible for undertaking the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environment and Nature Conservation (DENC).

1.2 SCOPE OF WORK

There has been no particular brief given to the consultants to undertake this study. However, the scope of the study has been determined with reference to the requirements of the relevant legislation and undertaken in terms of the NEMA EIA Regulations 2014, Integrated Environmental Management Information Series on Environmental Impact Reporting (2004) issued by DEAT and the Information Document on Requirements with respect to the EIA Process (January 2003), issued by the Department of Environmental Affairs and Development Planning of the Western Cape.

The basic scope of work will include the following:

- Review of all information.
- Participating in the progress of the development proposal.
- Scoping (identification of significant issues).
- Assessment of anticipated impacts.
- Identification of suitable mitigation measures to reduce negative impacts and enhance positive impacts.
- Submission for decision.

One of the crucial aims of an EIA is to ensure that the demands of sustainable development are met on a project level, within the context of the greater area. The most common definition of sustainable development is development that meets the needs of the present while not compromising the needs of future generations.

This EIA is therefore being undertaken with sustainable development as a goal. The assessment will look at the impacts of the proposals on the environment and assess the significance of these, as well as propose mitigation measures, as required, to reduce anticipated impacts to acceptable levels.

1.3 ASSUMPTIONS AND LIMITATIONS

The assumption is made that the information on which the report is based (i.e. specialist studies and project information) is correct.

Future management of the site is essential, and the assumption is made that the mitigation measures recommended by the specialists will be implemented on a long-term basis. This has a major bearing on the reliability of the predictions of significance of impact.

1.4 DESCRIPTION OF THE PROPOSED ACTIVITY

It is proposed that up to approximately 195ha of land be considered for additional irrigation on Farms 1763, 2372 and 2363, situated in the Kakamas South Settlement. The development will also include the construction of associated infrastructure for irrigation purposes for the various crops that could be cultivated. Irrigation water will be sourced from the proposed new Kakamas WWTW once constructed and operational.

The site is located approximately 6km west, south-west of the town of Kakamas, in the Kai !Garib Municipality, Northern Cape. The site is surrounded by existing crops (Lucerne and pecan nuts), previously disturbed by ostrich farming and natural undisturbed areas.

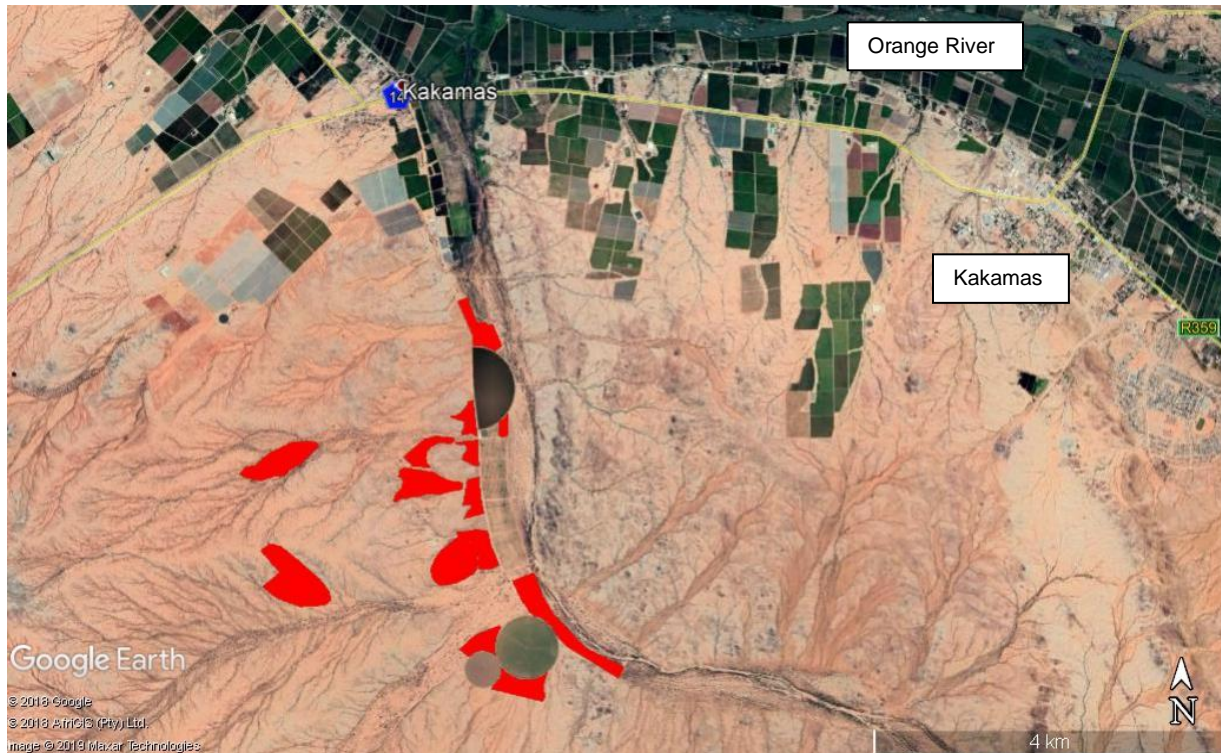


Figure 1: Google Earth Locality Plan. New development areas are indicated by the red polygons

The area is known for crop production, particularly wine, table and raisin grapes. Agriculture is a predominant economic sector in the area, contributing 49% to the formal employment in the Kai !Garib Municipality. According to the Kai !Garib Municipality Draft IDP (2018/19), the agricultural sector is still the main economic sector who made the biggest contribution to the economy of Kai !Garib in 2010. The Agriculture sector is also a major employer in the Municipality in terms of all formal employment. According to Statistics South Africa (Census 2011) about 399 of the households work on crops only; 1382 on livestock only; 222 on mix farming and 69 on other farming methods. It is also the sector with the largest potential for economic growth.

2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, as amended, EIA 2014 regulations the Scoping/EIA report must provide a description of the need and desirability of the proposed activity. The consideration of “need and desirability” in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

While the concept of need and desirability relates to the *type* of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which *need* refers to *time* and *desirability* to *place* – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to *wise use of land* – i.e. the question of what is the most sustainable use of land. The impact of development on people’s health and well-being, as well as its impact on natural and cultural areas, and therefore its desirability, will also be assessed during the Environmental Impact Report phase.

2.1 NEED

The town of Kakamas is in need for a new Wastewater Treatment Works, since the existing treatment works does not have sufficient capacity and is aging. The Kai !Garib Municipality has therefore proposed a new Waste Water Treatment Works that will have sufficient capacity to service Kakamas (a separate NEMA Application will be required and will be submitted). The treated effluent would however need to be disposed of, or utilised. One option is to use the treated effluent for irrigation.

The proposed location for the WWTW is on Erf 236, owned by the Verneujk Pan Trust. In agreement with the Kai !Garib Municipality, in exchange, the Verneujk Pan Trust would receive the treated effluent, which would have sufficient volume to irrigate approximately 200ha of crops.

Although exact figures are still to be determined, the proposed development is expected to create significant jobs opportunities during the construction and operational phases, with a majority of the job opportunities going towards previously disadvantaged individuals.

2.2 DESIRABILITY

The following factors determine the desirability of the area for the proposed agricultural development.

2.2.1 LOCATION AND ACCESSIBILITY

The proposed location is considered to be ideal, as it is in relatively close proximity to the source of water, the proposed Kakamas WWTW (3km). The site is also ideally situated in that its elevation is below that of the proposed Kakamas WWTW, thereby relying more on gravity and not on pump stations. The site is adjacent to existing similar crops (centre pivot irrigation areas, and pecan nuts). The site also has easy access from the N14.

Soil studies (**Appendix 4A**) conducted also found that the proposed soils were of Medium to High potential for the establishment of perennial crops.

2.2.2 COMPATIBILITY WITH THE SURROUNDING AREA

The proposed activity, and site is compatible with the surrounding area. The area, particularly along the Orange River is known for its agriculture and crop production, particularly grape production (wine, table and raisin grapes) although pecan nut, corn and lucerne is also common. The sites are adjacent to existing lucerne and pecan nut crops. Agriculture is a predominant economic sector in the area.

According to the Kai !Garib Municipality Draft IDP (2018/19), the Orange River played an enormous role in the formation of the municipal area and most of the towns and settlements are to be found close to or adjacent thereto. The economy is heavily depended on the Agricultural Sector, both intensive and extensive.

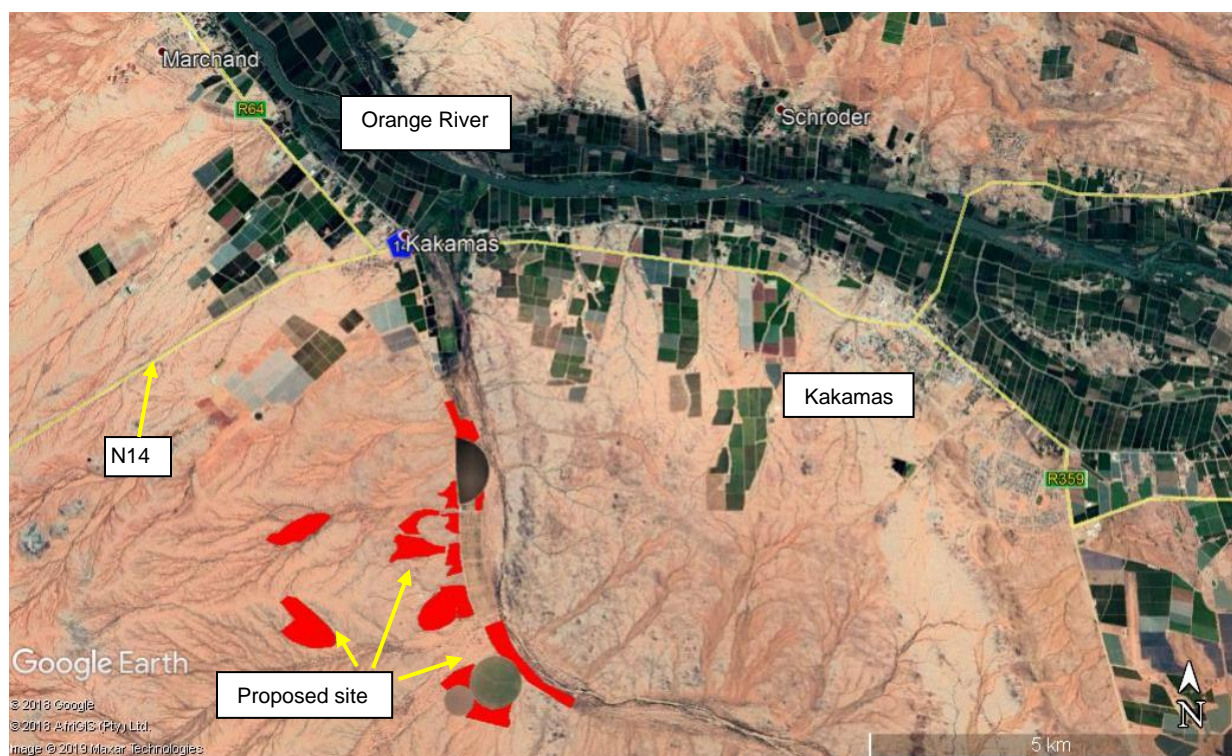


Figure 2: Google Earth image of the surrounding landscape. The predominant agricultural sector, especially along the Orange River, and surrounding the proposed site is clearly evident.

The area is known for crop production, particularly wine, table and raisin grapes. Agriculture is a predominant economic sector in the area, contributing 49% to the formal employment in the Kai !Garib Municipality. According to the Kai !Garib Municipality Draft IDP (2018/19), the agricultural sector is still the main economic sector who made the biggest contribution to the economy of Kai !Garib in 2010. The Agriculture sector is also a major employer in the Municipality in terms of all formal employment. According to Statistics South Africa (Census 2011) about 399 of the households work on crops only; 1382 on livestock only; 222 on mix farming and 69 on other farming methods. It is also the sector with the largest potential for economic growth.

3. LEGAL REQUIREMENTS

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA), to be read with section 24 (5): NEMA EIA Regulations 2010. However, the provisions of various other Acts must also be considered within this EIA.

The legislation that is relevant to this study is briefly outlined below.

3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Northern Cape to the Department of Environment and Nature Conservation (DE&NC).

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed agricultural development:

- 12** The development of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
 - (ii) infrastructure or structures with a physical footprint of 100 square metres or more;
- where such development occurs;
- (a) within a watercourse;
 - (b) in front of a development setback; or
 - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;
- 19** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;

- (a) will occur behind a development setback;
- (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
- (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

- 27** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for;
- (i) the undertaking of a linear activity; or
 - (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R325 (Listing notice 2) listed activities:

- 15** The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;
- (i) the undertaking of a linear activity; or
 - (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R324 (Listing notice 3) listed activities:

- 12** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.
- 14** The development of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;
 - (ii) infrastructure or structures with a physical footprint of 10 square metres or more;
- where such development occurs;
- (a) within a watercourse;
 - (b) in front of a development setback; or
 - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;
- Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;

The environmental process is being undertaken in distinct phases, refer to **Figure 3**.

An Application Form has been submitted to Department of Environment and Nature Conservation (DE&NC). On acknowledgment from DE&NC (**Appendix 1A**), the Scoping Process was undertaken to identify potential issues.

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environment and Nature Conservation (DE&NC). The Scoping Report and Plan of Study for EIA were approved by DE&NC and EnviroAfrica was advised to proceed with the EIA process.

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs will be placed at the forefront while serving their physical, psychological, developmental, cultural and social interests. The activity seeks to provide additional employment and economic development opportunities, which are a local and national need – *the proposed activity is expected to have a beneficial impact on people, especially developmental and social benefits, as well providing additional employment and economic development opportunities.*
- Development will be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. The impact that the activity will potentially have on these will be considered, and mitigation measures will be put in place - *potential impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP.*
- Where waste cannot be avoided, it will be minimised and remedied through the implementation and adherence of the Environmental Management Programme (EMP) – *the EMP is included in the EIR.*
- The use of non-renewable natural resources will be responsible and equitable.
- The negative impacts on the environment and on people's environmental rights will be anticipated, investigated and prevented, and where they cannot be prevented, will be minimised and remedied – *potential negative impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP.*
- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process – *refer to Section 7.2 below and Appendix 2.*
- The social, economic and environmental impacts of the activity will be considered, assessed and evaluated, including the disadvantages and benefits - *refer to Section 10 below*
- The effects of decisions on all aspects of the environment and all people in the environment will be taken into account, by pursuing what is considered the best practicable environmental option.

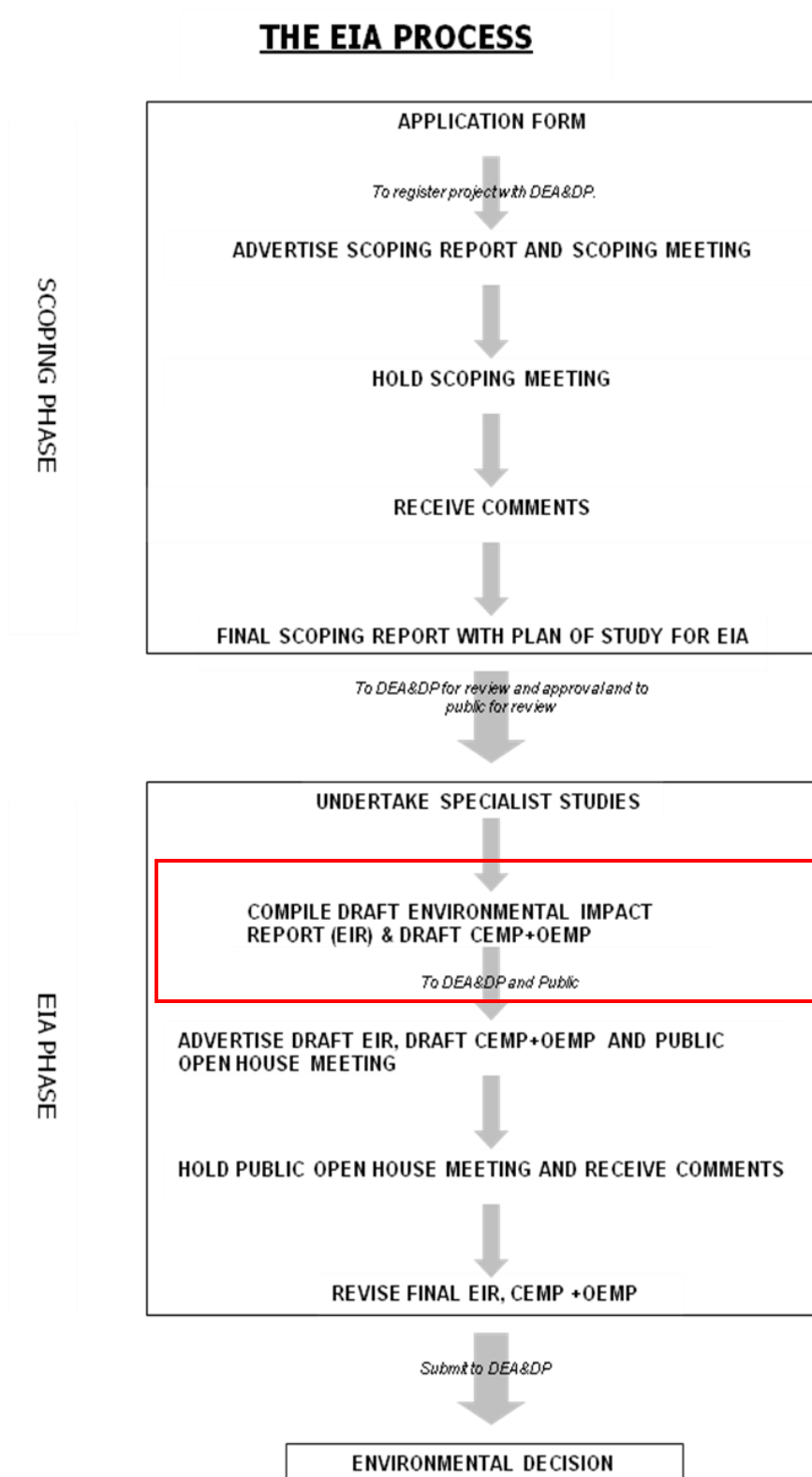


Figure 3: The EIA Process. Currently, this process is in the ‘EIA Phase – Compile Draft Environmental Impact Report (EIR) and draft EMP, as indicated in red.

3.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
- *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines and information Documents that have been consulted:

- Department of Environmental Affairs and Development Planning's (DEA&DP) *Environmental Impact Assessment Guideline and Information Document Series (Dated: March 2013)*:
 - ✓ *Guideline on Transitional Arrangements*
 - ✓ *Generic Terms of Reference for EAPs and Project Schedules*
 - ✓ *Guideline on Alternatives*
 - ✓ *Guideline on Public Participation*
 - ✓ *Guideline on Exemption Applications*
 - ✓ *Guideline on Appeals*
 - ✓ *Guideline on Need and Desirability*
- Department of Environmental Affairs and Tourism (DEAT) *Integrated Environmental Management Information Series*.

3.5 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities. The need to protect listed ecosystems is addressed (*Section 54*).

3.6 NATIONAL FORESTS ACT

The National Forests Act, 1998 (Act 84 of 1998) (NFA) makes provisions for the management and protection of forests, as well as specific tree species.

According to the Botanical Assessment (**Appendix 5A**), three tree species protected in terms of the NFA that was observed on the site. These will be discussed and assessed in Section 10.1.

In terms of section 15(1) of the National Forests Act, 1998, no person may -

- (a) cut, disturb, damage or destroy any protected tree; or
- (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except-
 - (i) under a license granted by the Minister; or
 - (ii) in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

3.7 NORTHERN CAPE CONSERVATION ACT, ACT 09 OF 2009

On the 12th of December 2011, the new Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect, which provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1 and 2 of the Act give extensive lists of specially protected and protected fauna and flora species in accordance with this act. The NCNCA is a very important Act in that it put a whole new emphasis on a number of species not previously protected in terms of legislation.

It also put a new emphasis on the importance of species, even within vegetation classified as "Least Threatened" (in accordance with GN 1002 of 9 December 20011, promulgated in terms of the National Environmental Management Biodiversity Act 10 of 2004). Thus, even though a project may be located within a vegetation type or habitat previously not considered under immediate threat, special care must still be taken to ensure that listed species (fauna & flora) are managed correctly.

According to the Botanical Assessment (**Appendix 5A**), six species protected in terms of the NCNCA were encountered on site. These will be discussed and assessed in Section 10.1.

3.8 NATIONAL WATER ACT

Besides the provisions of NEMA for this EIA process, the proposed development also requires authorizations under the National Water Act (Act NO. 36 of 1998). The Department of Water and Sanitation (DWS), who administer that Act, will be a leading role-player in the EIA.

The proposed development “triggers” sections of the National Water Act. These are the following:

- S21 (a) - *Taking water from a water resource*
Water is being pumped out of the Orange River for the farming operation.
- S21 (b) – *Storage of water*
There are two off-channel dams of 25 000m³ each.
- S21 (c) - *Impeding or diverting the flow of a water course*
The proposed development is spanning the banks of a drainage line. The drainage line would be altered, should the development go ahead.
- S21 (j) - *Altering the bed, bank, course of characteristics of a water course.*
Some part of the proposed development will alter the characteristics of the banks of the drainage line.

A Water Use Licence Application (WULA) has been compiled and has been submitted to DWS.

Government Notice 509 of 26 August 2016 is also applicable to the development:

- An extensive set of regulations that apply to any development in a water course is listed in this government notice in terms of Section 24 of the NWA. No development take place within the 1:100 year-flood line without the consent of the DWS. If the 1:100-year flood line flood line is not known, no development may take place within a 100m from a water course without the consent of the DWS.

4. ALTERNATIVES

Alternatives to the proposed development are very limited and have therefore not been considered for the following reasons described below.

4.1 SITE ALTERNATIVES

The proposed site is located on a property currently owned by the Applicant to be further developed for agriculture. No other feasible site alternatives are therefore available at this stage. The site is ideally situated due to its proximity and elevation to the proposed Kakamas WWTW, the N14 for access, and the surrounding area is characterised by similar crop production. Soil studies (**Appendix 3**) conducted also found that the proposed soils were of Medium to High potential for the establishment of perennial crops.

Although other areas were investigated on the properties, these were not deemed viable either due to:

- Being within drainage lines
- Being on unsuitable soil
- Unsuitable elevation with respect to the proposed Kakamas WWTW requiring additional pump stations.

4.2 ACTIVITY ALTERNATIVES

Activity alternatives (besides agriculture) are also very limited with no feasible alternatives to assess. Agriculture is the most prevalent activity in the surrounding area, with the Applicant already involved in crop production in the area. As discussed earlier, agriculture is also the predominant economic sector in the area, contributing 49% to the formal employment in the Kai !Garib Municipality.

The development was proposed due to the need for the disposal and utilisation of treated effluent from the proposed Kakamas WWTW. Irrigation of crops with the treated water is the most feasible option.

There are therefore no feasible activity alternatives to assess.

4.3 NO-GO ALTERNATIVE

This is the option of not developing the area for additional irrigation and crop production. The current status quo will remain. Although this might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not developing the site for crop production will not be realised. As described in *Section 2.1*, the jobs opportunities and expected contribution to the region's economy would not be realised.

Other means of disposing and/or utilising the treated effluent from the proposed Kakamas WWTW would then need to be investigated.

The no-go option would only be recommended if it were found that the proposed development on this site or in this area might potentially cause substantial detrimental harm to the environment.

5. SITE DESCRIPTION

5.1 LOCATION

The site is located on Farms 1763, 2372 and 2363, situated in the Kakamas South Settlement. The development will also include the construction of associated infrastructure for irrigation purposes and for the various crops that could be cultivated. Irrigation water will be sourced from the proposed new Kakamas WWTW once constructed and operational.

The site is located approximately 6km west, south-west of the town of Kakamas, in the Kai !Garib Municipality, Northern Cape.

Site coordinates:

Point	Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
1	28°	46'	46.08"	20°	33'	44.91"
2	28°	47'	38.08"	20°	31'	46.66"
3	28°	47'	59.80"	20°	32'	18.58"
4	28°	48'	27.78"	20°	32'	35.83"
5	28°	48'	34.89"	20°	31'	52.25"
6	28°	48'	27.96"	20°	33'	08.74"
7	28°	49'	11.50"	20°	33'	22.21"
8	28°	49'	03.28"	20°	33'	52.81"

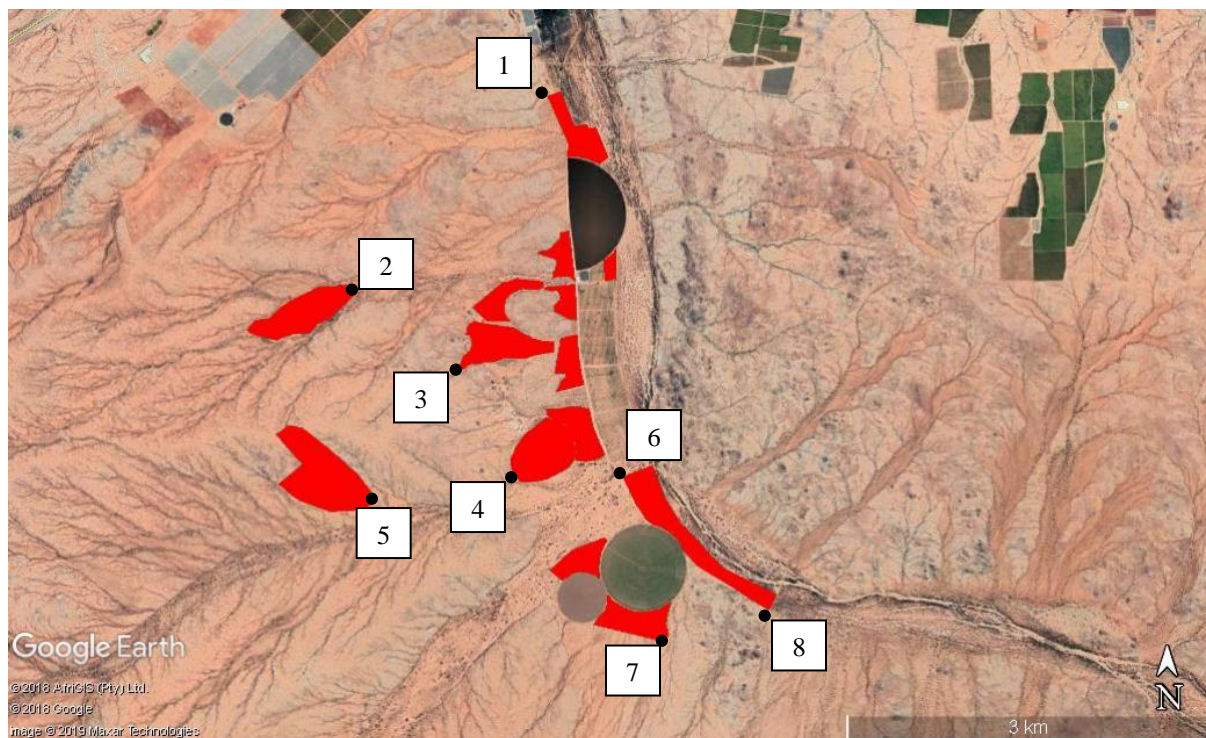


Figure 4: Google Earth Map showing the site coordinate points

The site is surrounded by existing crops (Lucerne and pecan nuts), previously disturbed by ostrich farming and natural undisturbed areas. See Figures 1 and 2 above, and Figures 5 – 19 below.

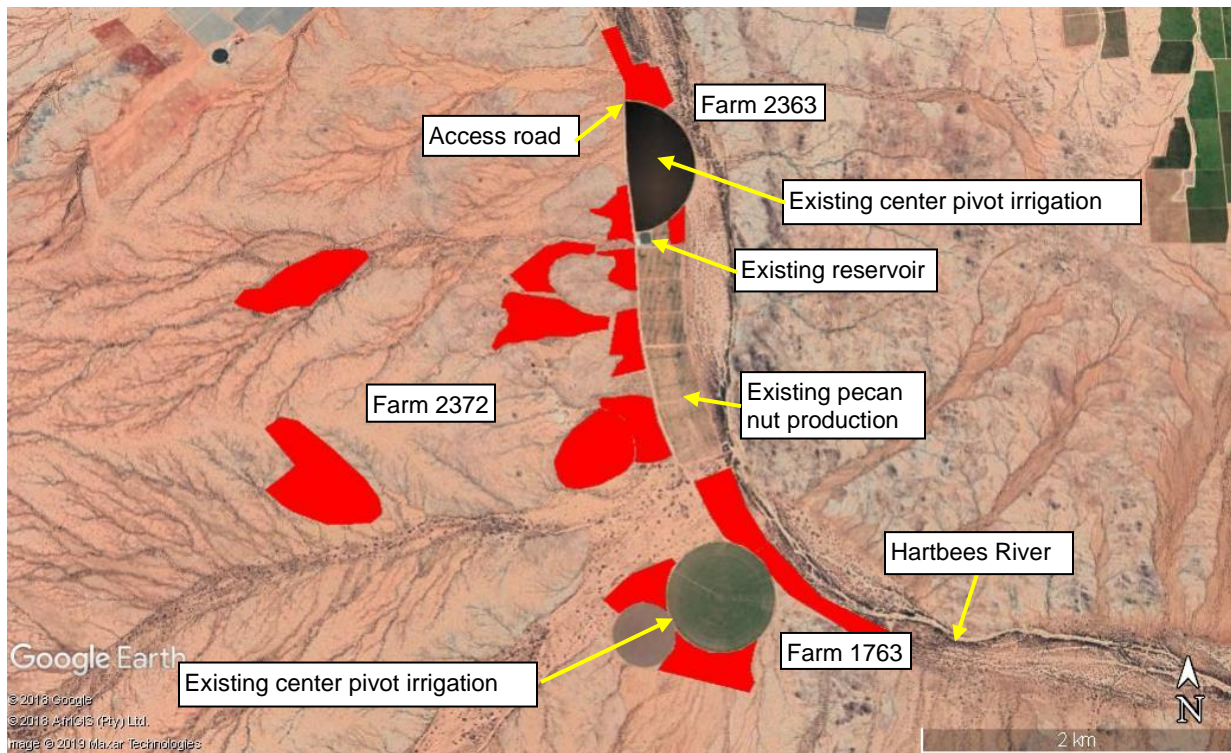


Figure 5: Google Earth Map showing the surrounding area. New development areas are indicated by the red polygons.

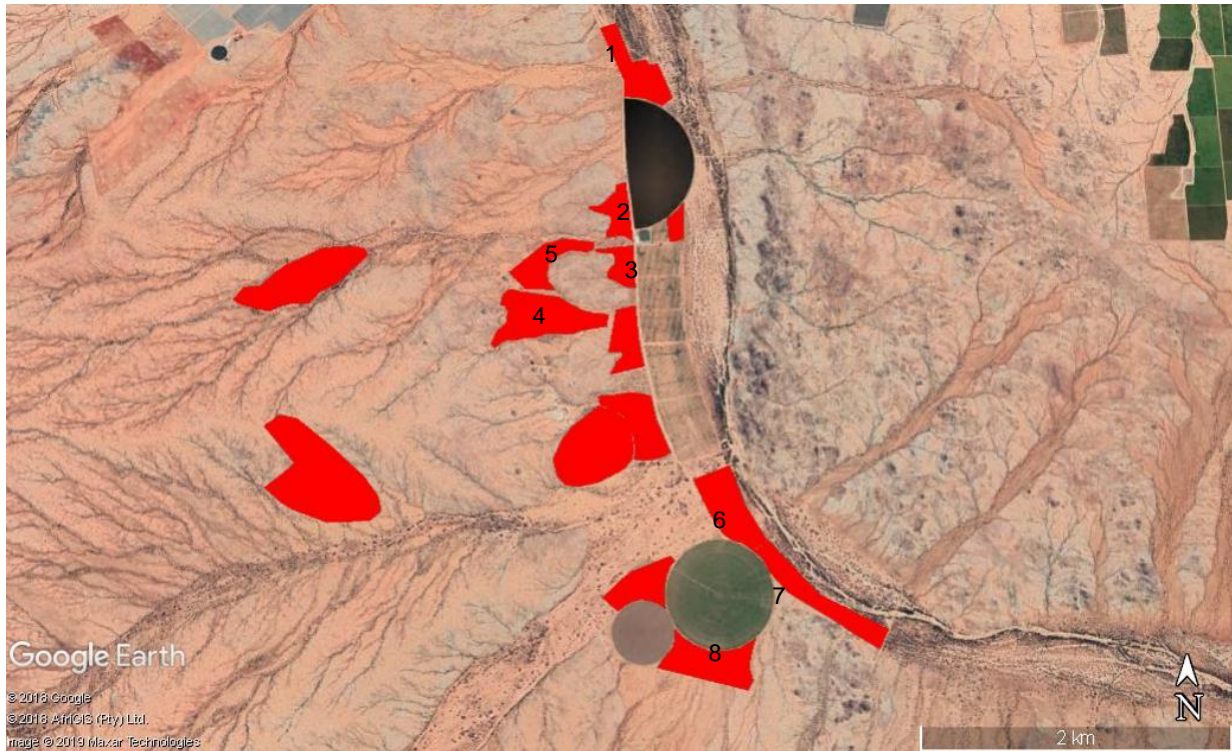


Figure 6: Google Earth Map showing photo locations and directions as per photographs below.



Figure 7: General view of the proposed site looking east from the access road. Taken from Point 1 (see Figure 6)



Figure 8: General view of part of the site looking south-west. Taken from Point 2



Figure 9: General view of part of the existing centre pivot irrigation area looking south from the access road. Taken from Point 2.



Figure 10: General view of part of the proposed site, looking south from the access road. Taken from Point 3.



Figure 11: General view of the existing pecan nut trees, looking north from the access road. Taken from Point 3.



Figure 12: General view of the proposed centre pivot irrigation area, and previous ostrich farming area, looking north. Taken from Point 4.



Figure 13: General view of the proposed centre pivot irrigation area, and previous ostrich farming area, looking south. Taken from Point 4.



Figure 14: General view of the proposed development area, looking north. Taken from Point 5.



Figure 15: General view of the proposed development area, looking north-east. Taken from Point 6.



Figure 16: General view of the proposed development area (to the left of the access road), looking east. The existing centre pivot irrigation area can be seen to the right of the image. Taken from Point 6.



Figure 17: General view of the proposed development area looking north-east. Taken from Point 7.



Figure 18: General view of the proposed development area (to the left of the road), looking southwest. The existing centre pivot irrigation area can be seen to the right of the image. Taken from Point 8.



Figure 19: General view of the existing irrigation dam and shed on site.

5.2 VEGETATION

The proposed site of the agricultural development is generally undeveloped, fallow and generally near natural. Some proposed areas have been partially disturbed by previous agricultural activities (ostrich and crop farming).

According to the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version) only one broad vegetation type is expected in the proposed area and its immediate vicinity, namely Bushmanland Arid Grassland. The vegetation encountered generally conforms to Bushmanland Arid Grassland.

Three plant communities were encountered namely:

- A sparse (semi-desert type) low shrubland with grasses sometimes present on the open undulating plains
- A denser and higher riparian vegetation was encountered next to the watercourses. The more pronounce these water courses the more established the riparian zone became.
- Sparse woodland dominated by magnificent trees was encountered in the deeper sandy soils next to the Hartbees River.

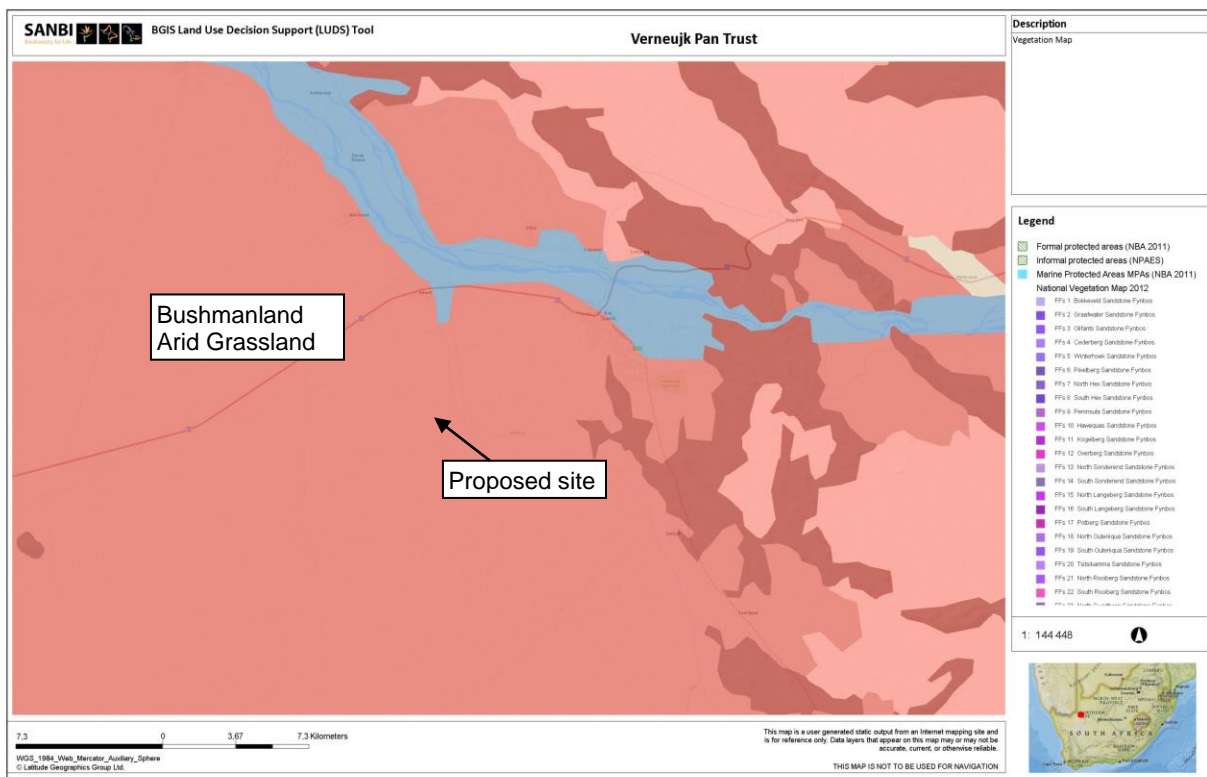


Figure 20: SANBI Vegetation map of the area.

5.3 FRESHWATER

There are potentially two watercourses that may be impacted by the proposed development:

- The Hartbees River (located to the east of the development, with some of the proposed development areas on the western bank of the river)
- A number of drainage lines (ephemeral stream) within the area.

The Orange River and the Hartbees River confluence is located approximately 3.3km north of the development site.

A series of pans separate the Sak River from the Hartbees River. The Hartbees River only flows when these pans overflow. This happened in 1999 and in 2010.

The Lower Orange River is flanked by numerous drainage lines, which are mostly dry and only contain water during the occasional thunderstorm. These drainage lines are a part of the arid landscape. The drainage lines only have water during very large rainfall events. Most of the time the drainage lines are dry, for months and even years on end.

Next to the farm road along the Hartbees River, the drainage lines fan out to connect to one another in a broad and continuous fan, interconnected, with no visual demarcation between drainage lines.

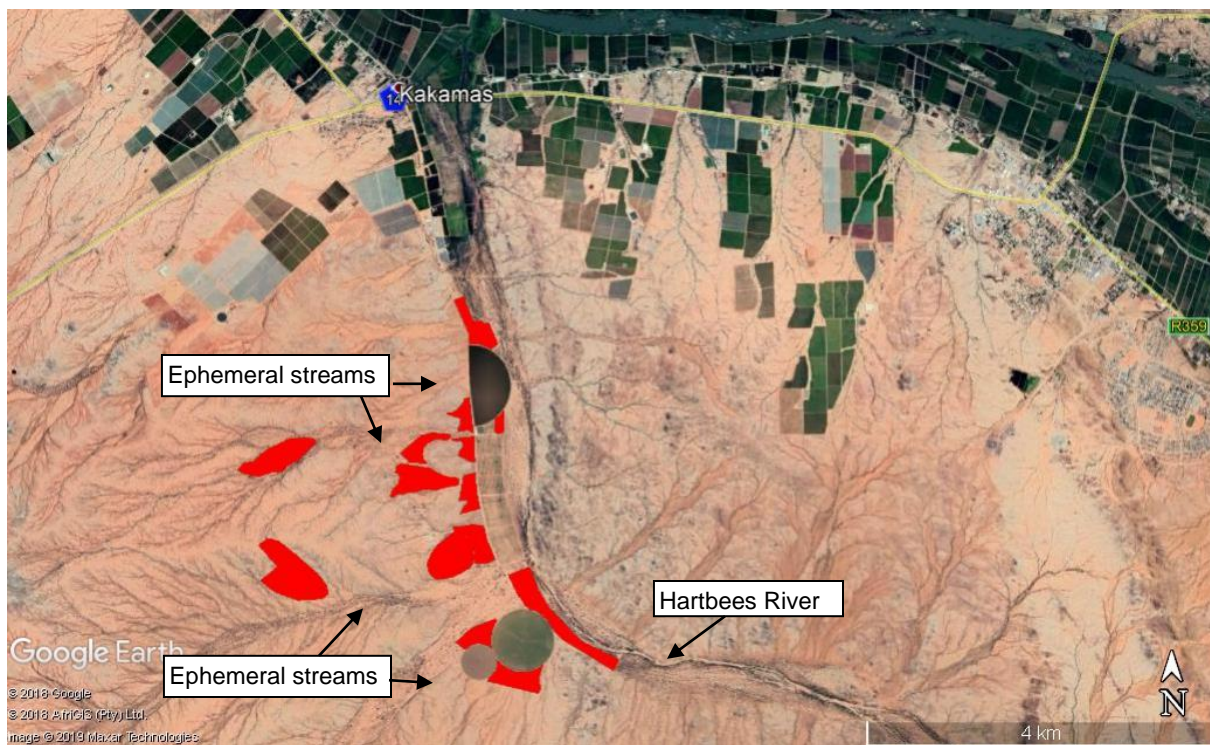


Figure 21: Google Earth image showing the watercourses in the area.

5.4 SOIL POTENTIAL

According to the Soil Potential and Agricultural Development Report (**Appendix 4A**), the dominant soil types in the area are the Glenrosa and Brandvlei soils (Medium-Low soil potential), and Mispah, Coega and Glenrosa soil (Low soil potential).

According to the Agricultural Development Report (**Appendix 4A**), the overall classified soil for the proposed development area has a Medium agricultural potential in its natural state for fruit production. This is without any further preparation practices which would improve the soil potential.

5.5 CLIMATE

Kakamas is in an arid climate. Kakamas normally receives about 62mm of rain per year, with most rainfall occurring mainly during autumn. It receives the lowest rainfall (0mm) in June and the highest (19mm) in March.

The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Kakamas range from 20°C in July to 33°C in January. The region is the coldest during July when the temperature drops to 3.1°C on average during the night.

5.6 SOCIO-ECONOMIC CONTEXT

According to the Kai !Garib Municipality IDP Review 2018/19, the Orange River played an enormous role in the formation of the municipal area and most of the towns and settlements are to be found close to or adjacent thereto. The economy is heavily depended on the Agricultural Sector, both intensive and extensive. However, the major roads (N14, R27 and R359) assist in the growth the municipal area experience.

Agriculture is the biggest contributor towards employment in Kai !Garib, contributing 49% to the Formal Sectoral Employment. It is followed by the government as an employer of about 17%; the household 14%, Finance sector at 8% with the trading sector at 7%. Construction contributes 4%; Construction is at 4% with transport, manufacturing and mining all at 2% and 0% for the electrical sector.

According to the Kai !Garib Municipality IDP Review 2018/19 it is indicated that 49 391 people are economically active (employed or unemployed but looking for work) (Stats SA, 2016), and of these, 10% are unemployed. Of the 49 391 economically active population 30 537 are youth (15 – 34 years) in Kai !Garib Municipal area.

As stated above, the agricultural sector is still the main economic sector who made the biggest contribution to the economy of Kai !Garib in 2010. The Agriculture sector is also a major employer in the Municipality in terms of all formal employment. According to Statistics South Africa (Census 2011) about 399 of the households work on crops only; 1382 on livestock only; 222 on mix farming and 69 on other farming methods. It is also the sector with the largest potential for economic growth. The commercial farmers farm especially with grapes for export, raisins and wine, while citrus types of fruit are also becoming more prevalent in the area.

There are also three wine cellars in the area at Keimoes, Kakamas and Kanoneiland. High quality table grapes are produced at these cellars, as well as quality grape juice. Several permanent jobs are created through these wine cellars. Two major raisin export companies are also established in Kai !Garib area.

The emerging farmers focus more on small stock farming, lucern, cotton, corn, and nuts which are cultivated under irrigation from the Orange River.

Major constraints for agricultural development include poor quality of access roads to and from farms, farming skills amongst the youth and finances for emerging farmers.

5.7 HERITAGE FEATURES

According to the Heritage Impact Assessment (**Appendix 5B**), no significant heritage sites or features were identified within the development footprint.

6. SERVICES

Due to the nature of the proposed development, services from the municipality, and or other service provider will not be utilised. However, the development will be requiring additional water for the irrigation purposes.

A brief description of the bulk services is given below.

6.1 WATER

Water will be sourced from the proposed new Kakamas Wastewater Treatment Works, located on Erf 236, Kakamas. The proposed WWTW is approximately 3km to the east of the site.

Treated effluent will be piped (gravity fed) from the WWTW. The expected volume of treated effluent is expected to be sufficient to irrigate approximately 200ha of crops.

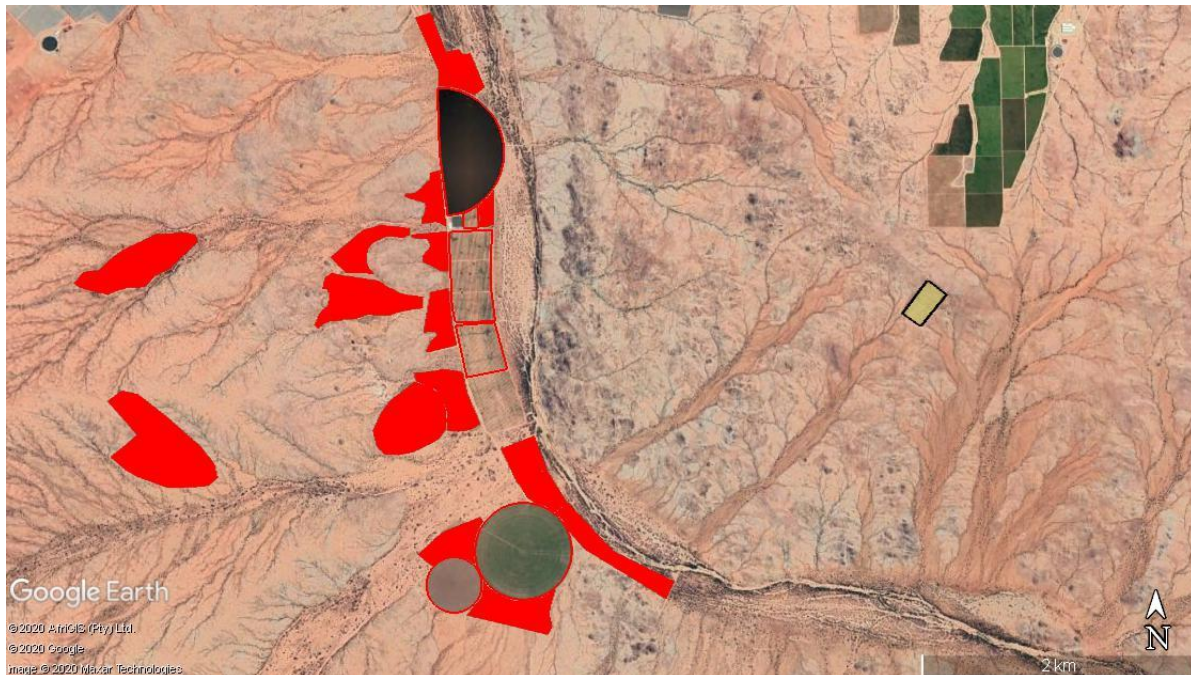


Figure 22: Google Earth image showing the location of the proposed Kakamas WWTW (yellow polygon) in relation to the proposed agricultural development.

Up until the Kakamas WWTW is developed and operational, water will be sourced from the existing water rights on the farm.

7. PROCESS TO DATE

The section below outlines the various tasks undertaken to date, the members of the team involved in the project, as well as the Public Participation Process.

7.1 TASKS UNDERTAKEN TO DATE

Table 1: Tasks undertaken in the EIA to date

DATE	TASK
<u>INITIAL PUBLIC PARTICIPATION</u>	
November 2018	Initial public participation, including newspaper advertisements, posters, letter drops and notification letters to identified interested and affected parties.
October 2018	Compilation of the Draft Scoping Report
16 November – 21 December 2018	Distribution of notification letters and the Draft Scoping Report to Registered Interested and Affected Parties
<u>NEMA APPLICATION FORM AND SCOPING PHASE</u>	
23 January 2020	Submit Application Form and Post-Application Scoping Report to DE&NC
04 March 2020	Received acknowledgement from DE&NC
03 February – 05 March 2020	30-day comment period on the Post-Application Scoping Report. Notices of the availability of the Scoping Report sent to all Registered Interested and Affected Parties
23 March 2020	Final Scoping Report submitted to DENC for a decision
	Undertake Specialist Studies where required
	Submit Environmental Impact Report

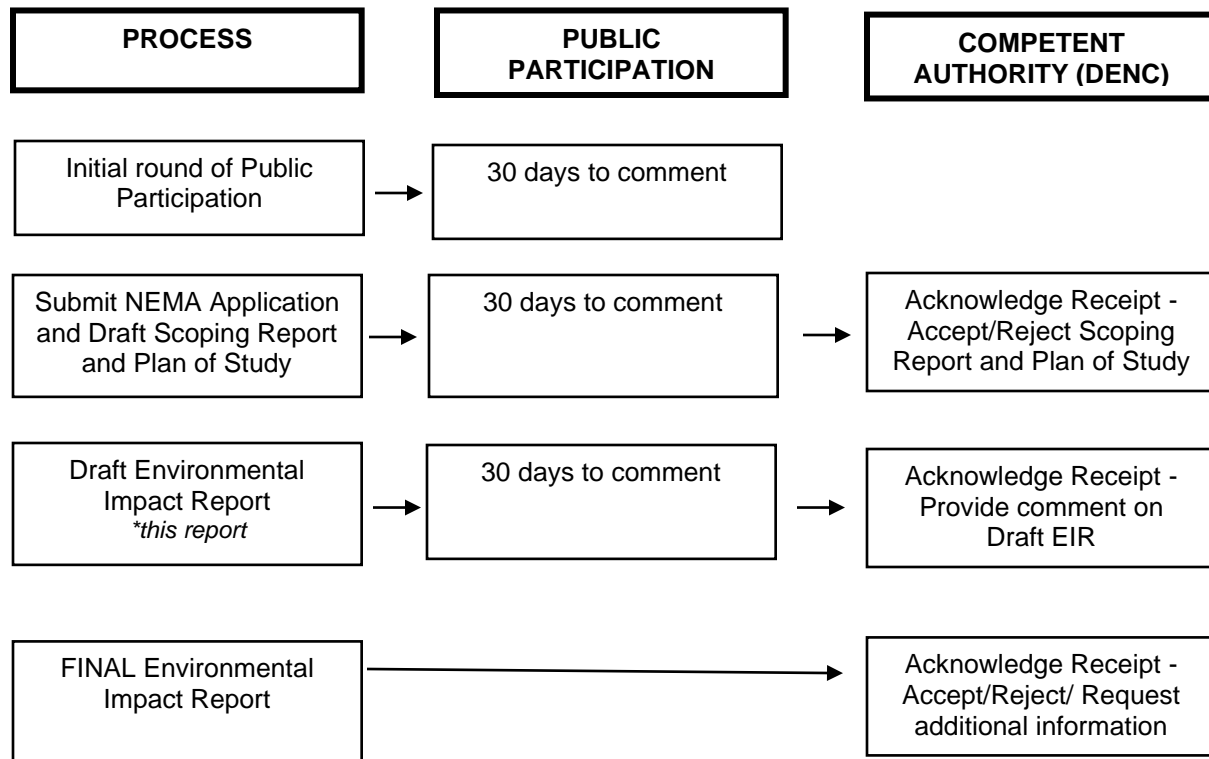


Figure 23. Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process.

7.2 TASKS TO BE UNDERTAKEN DURING THE EIA PHASE

The following tasks must still be undertaken during the EIA phase of the process:

- Compile Draft Environmental Impact Report (EIR) for public comment based on specialist information (THIS DOCUMENT).
- Distribute and/or make the Draft EIR available for viewing and comment
- Receive comments on Draft EIR. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR).
- Preparation of a FINAL EIR for submission to DE&NC for consideration and decision-making.

Please refer to Figure 23 to see where the public participation process is present in the environmental impact assessment. The Interested and Affected Parties will have a chance to view and comment on all the reports that are submitted. The figures also indicated what timeframes are applicable to what stage in the process. If required, meetings with key stakeholders will be held.

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR). The Final EIR will then be submitted to DE&NC for consideration and decision-making.

Correspondence with I&APs will be via post, fax, telephone, email and newspaper advertisements.

Should it be required, this process may be adapted depending on input received during the on-going process and as a result of public input. DE&NC will be informed of any changes in the process.

7.3 PROFESSIONAL TEAM

The following professionals are part of the project team.

Table 2: Members of the professional team

DISCIPLINE	SPECIALIST	ORGANISATION
Environmental Consultants	Clinton Geysler / Bernard de Witt	EnviroAfrica
Soil Study	Danie Kritzinger	AgriMotion
Freshwater Specialist	Dr. Dirk van Driel	Watsan Africa
Botanist	Peet Botes	PB Consult
Heritage	Jan Englebrecht/ Heidi Fivaz	Ubique Heritage Consultants

7.4 PUBLIC PARTICIPATION

Interested and Affected Parties (I&APs) have been and will be identified throughout the process. Landowners adjacent to the proposed site, relevant organs of state, organizations, ward councillors and the Local and District Municipality were added to this database. A complete list of organisations and individual groups identified to date is shown in **Appendix 3A**.

Public Participation will be conducted for the proposed agricultural development in accordance with the requirements outlined in Regulation 41 of the NEMA EIA Regulations 2014. The issues and concerns raised during the scoping phase will be dealt with in the EIA phase of this application.

As such each subsection of Regulation 41 contained in Chapter 6 of the NEMA EIA Regulations 2014 will be addressed separately to thereby demonstrate that all potential Interested and Affected Parties (I&AP's) were notified of the proposed development.

R54 (2) (a):

R41 (2) (a) (i): Posters were also be placed at conspicuous sites around the site, mostly along the main access road and entrances to the various proposed areas. Posters were also placed in Kakamas, including at the Agrimark in Kakamas, and at the Kai !Garib Municipality offices, as well as the Hartebees Cash Store in Alheit near the site road and the Agrimark on the road towards Augrabies (please refer to **Appendix 3D**)

The posters contained all details as prescribed by R41(3) (a) & (b) and the size of the on-site poster was at least 60cm by 42cm as prescribed by section R41 (4) (a).

R41 (2) (a) (ii): N/A. There is no alternative site.

R41 (2) b):

R41 (2) (b) (i): An initial notification letter was sent to the landowner/s (please refer to **Appendix 3C** for proof of notification letters sent) and letter drops were conducted at the staff housing on the site.

R41 (2) (b) (ii): Initial notification letters will be delivered to landowners and occupiers adjacent to the site

R41 (2) (b) (iii): An initial notification letter was sent to the municipal Ward councillor at the Kai !Garib Municipality, for the ward in which the site is situated (please refer to **Appendix 3C** for proof of notification letters sent).

R41 (2) (b) (iv): An initial notification letter was sent to the Municipal Manager and mayor of Kai !Garib Municipality as the municipality is the Applicant

R54 (2) (b) (v): Initial notification letter (please refer to **Appendix 3C** for proof of notification letters sent) will be sent to the following organs of state having jurisdiction in respect of any aspect of the activity:

- Department of Water and Sanitation
- Department of Agriculture and Land Reform
- Department of Roads and Public Works
- Department of Agriculture, Forestry and Fisheries
- Department of Cooperative Governance, Human Settlements and Traditional Affairs
- Department of Environment and Nature Conservation

R41 (2) (c) (i): An advertisement was placed in the local newspaper, Express Northern Cape, on 28 November 2018 (please refer to **Appendix 3B** for proof of advertisement).

R41 (2) (d): N/A

R41 (6):

R41 (6) (a): All relevant facts in respect of the application were made available to potential I&AP's.

R41 (6) (b): I&AP's were given more than a 30-day registration and comment period on the proposed application during the first round of public participation.

R42 (a), (b), (c) and R43(2): A register of interested and affected parties was opened, maintained and is available to any person requesting access to the register in writing (please refer to **Appendix 3A** for the list of Interested and Affected Parties).

Please find attached in **Appendix 3:**

- Proof of Notice boards, advertisements and notices that were sent out
- List of potential interested and affected parties
- Summary of issues raised by interested and affected parties

The Draft Scoping Report was made available to all Registered Interested and Affected Parties for a 30-day comment period (03 February 2020 – 05 March 2020).

7.4.1 PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE:

A number of groups and individuals were identified as Interested and Affected Parties during the initial Public Participation Process. A complete list of organisations and individual groups identified to date, as well as those I&APs that have registered are shown in **Appendix 3A**.

Full copies of the Environmental Impact Assessment Report (EIR) will be sent to all Registered I&APs, and will be notified of the Environmental Impact Report (EIR) by means of notification letters (via preferred method of communication), informing them of the availability of the Draft EIR and will be invited to comment. The EIR will be made available for a 30-day comment period.

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (Final EIR) in the form of a Comments and Response Table. The Final EIR will be made available for a further 30-day comment period. The Final EIR will then be submitted to DENC for decision.

Should it be required, this process may be adapted depending on input received during the ongoing process and as a result of public input. Both DENC and registered I&APs will be informed of any changes in the process.

7.4.2 INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) have been notified by means of advertisements in regional and local newspapers, site notices and letters and/or emails to registered I&APs on the project database.

A list of I&APs is included as **Appendix 3A**.

8. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Environmental issues were raised through informal discussions with the project team, specialists and authorities, as well as by Interested and Affected Parties during the public participation period of the Scoping Report. All issues raised will be assessed in the specialist reports and will form part of the Environmental Impact Report. Any additional issues raised during the public participation will be listed in the Final Environmental Impact Report.

The following potential issues have been identified:

8.1 BOTANICAL

Due to the size of the development and the expectant loss of vegetation during the construction phase of the project, a Botanical Impact Assessment (**Appendix 5A**), has been conducted. This will also determine if there is any sensitive or endangered vegetation on the proposed site.

The botanical assessment will include the following:

- The significance of the potential impact of the proposed project, alternatives and related activities – with and without mitigation – on biodiversity pattern and process at the site, landscape and regional scales.
- Recommended actions that should be taken to prevent or, if prevention is not feasible, to mitigate impacts.

8.2 HERITAGE

Due to the nature and scale of the development, the possible impact on heritage resources has been identified as a possible environmental impact as a result of the development of the vineyards and associated infrastructure.

A Heritage Impact Assessment (**Appendix 5B**) has been conducted on the site.

The terms of reference for the Heritage studies are as follows:

- To determine whether there are likely to be any important archaeological and palaeontological sites or remains that might be impacted by the proposed development;
- To identify and map archaeological sites/remains that might be impacted by the proposed development;
- To assess the sensitivity and conservation significance of archaeological sites/remains in the inundation area;
- To assess the status and significance of any impacts resulting from the proposed development, and;
- To identify measures to protect any valuable archaeological sites/remains that may exist within the estimated area.

8.3 FRESHWATER

Due to the size and nature of the development and the location of the proposed development with respect to the Hartbees River, and the ephemeral streams on the site, a freshwater impact assessment was conducted.

The terms of reference for the Freshwater assessment are as follows:

- Literature review and assessment of existing information
- Site Assessment of the proposed activities and impact on the associated freshwater systems. This will include an assessment of the freshwater ecological condition, using river health indices such as in-stream and riparian habitat integrity, aquatic macro-invertebrates and riparian vegetation to determine set back lines and geomorphological condition of the streams, which will then determine the overall Ecstatus of the streams and provide data that will inform the Water Use Licence Application of the project.
- Describe ecological characteristics of freshwater systems and compile report based on the data and information collected in the previous two tasks, describe ecological characteristics of the freshwater systems, comment on the conservation value and importance of the freshwater systems and delineate the outer boundary of the riparian zones/riverine corridors.
- Evaluate the freshwater issues on the site and propose mitigation measures and measures for the rehabilitation of the site as well as setback lines for future development.
- Compilation of the documentation for submission of the water use authorisation application (WULA) to the Department of Water and Sanitation (if deemed necessary).

8.4 SOIL STUDY

A Soil Study was conducted independently of this Environmental Impact process, for the Applicant to determine the suitability of the soils for crop production, and provide recommendations with regards to irrigation, soil preparation etc. to maximise yields, prevent wastage of resources etc.

8.5 OTHER ISSUES AND IMPACTS

The proposed agricultural development has the following additional impacts:

8.5.1 ENERGY REQUIREMENTS

Construction energy requirements:

Energy requirements during the construction phase is negligible.

Operational phase energy requirements:

The existing Eskom connection will be utilised during the operational phase for the use of pumps.

8.5.3 NATURE AND QUANTITY OF RAW MATERIALS

This development is not expected to utilize any raw materials besides water for irrigation during the operational phase (see water requirements above).

8.5.4 WASTE TYPES, QUANTITIES AND DISPOSAL METHODS

Construction Phase

The construction phase is not expected to produce significant amounts of construction waste.

Natural vegetation removed will be consolidated and left to decompose, to be used as compost during the operational phase

Operational Phase

Since the development is agricultural in nature, with only vineyards be cultivated, the only expected waste will be organic in nature, such as vine cuttings, and grape waste (skins, seeds). This waste will also be consolidated and left to decompose, to be used as compost.

There will be no industrial or manufacturing activities in the development, and as such, no hazardous waste or emissions is expected to be generated.

8.5.5 EMPLOYMENT OPPORTUNITIES

The proposed activity is expected to generate employment opportunities in both the construction and operational phases.

9. SPECIALIST STUDIES

Based on the issues raised by the I&APs and the project team, specialist studies were undertaken to provide information to address the concerns and assess the impacts of the proposed development alternatives on the environment.

The specialists are provided with set criteria for undertaking their assessments, to allow for comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

9.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

These criteria are based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989.

These criteria include:

- **Nature of the impact**
This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.
- **Duration of the impact**
The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**
The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**
The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Accumulative impact**
Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.
- **Degree of confidence in predictions**
The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment.

The final impact assessment report should at least include the following sections:

- Executive Summary
- Introduction and Description of Study
- Methodology
- Results
- Assessment of Impacts (including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Discussion
- Recommendations (Pre-Construction, Construction and Operational Phases)
- Conclusion

9.2 BRIEFS FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA

9.2.1 BOTANICAL ASSESSMENT

Peet Botes (PB Consult) was appointed and undertook the Botanical Assessment on the proposed site – **Appendix 5A**.

The terms of reference for this study include the following:

- Evaluate the proposed site(s) in order to determine whether any significant botanical features will be impacted as a result of the proposed development.

- Determine and record the position of any plant species of special significance (e.g. protected tree species, or rare or endangered plant species) that should be avoided or that may require “search & rescue” intervention.
- Locate and record sensitive areas from a botanical perspective within the proposed development footprint that may be interpreted as obstacles to the proposed development.
- Make recommendations on impact minimization should it be required
- Consider short- to long-term implications of impacts on biodiversity and highlight irreversible impacts or irreplaceable loss of species.

9.2.2 HERITAGE IMPACT ASSESSMENT

Jan Engelbrecht of the Ubique Heritage Consultants was appointed to compile the Heritage Impact Assessment (HIA) – **Appendix 5B**.

The terms of reference for the heritage impact study were:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources; an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

In addition, the HIA/AIA should comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications and expertise of the person who prepared the report; and a statement of competency.

9.2.3 FRESHWATER IMPACT ASSESSMENT

Dr Dirk van Driel (Watsan Africa) has been appointed to undertake the Water Use Licence Application (WULA) in terms of section 21 of the National Water Act (NWA, 36 of 1998).

A Fresh Water Report (**Appendix 5C**) is a WULA requirement. The Freshwater Assessment must also include the following:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility.
- A description and assessment of the potential freshwater resources and potential issues and impacts associated with the proposed development on these resources.
- Identification of enhancement and mitigation aimed at maximizing opportunities and avoiding and or reducing negative impacts.

10. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The specialist studies detailed in Section 8 and 9 were undertaken to determine significance of the impacts that may arise from the proposed development. The findings of the specialist studies are summarised here. Full copies of the studies are included in **Appendices 5A – 5C**.

The following specialist studies were undertaken:

10.1 BOTANICAL ASSESSMENT

Peet Botes (PB Consult) undertook the Botanical Impact Assessment – The Botanical Impact Assessment is included as **Appendix 5A**.

10.1.1 KEY FINDINGS

According to the Botanical Impact Assessment (**Appendix 5A**), in accordance with the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version) only one broad vegetation type is expected in the proposed area and its immediate vicinity, namely **Bushmanland Arid Grassland**. More than 99% of this vegetation still remains, but only 4% is formally conserved (Augrabies Falls National Park). According to the National list of ecosystems that are threatened and in need of protection (GN 1002, December 2011), Bushmanland Arid Grassland, remains classified as *Least Threatened*.

- Vegetation Encountered

According to the Botanical Impact Assessment (**Appendix 5A**), Bushmanland Arid Grassland is generally described as sparsely vegetated (semi-desert) low shrubland dominated by whit grasses (*Stipagrostis* species) on gently sloping or irregular plains, which can, in years of abundant rainfall, have rich displays of annual herbs. In this case “typical” Bushmanland Arid Grassland was observed as one moved away from the larger river systems (e.g. the Hartbees River) (e.g. proposed development sites 1, 2, 3 and 9)(see Figure 24 below). Next to the Hartbees River the deeper sandy soils (together with better availability of water) the vegetation is transformed into sparse woodland dominated by magnificent trees like *Vachellia erioloba*, *Euclea pseudebenus*, *Ziziphus mucronata* and *Tamarix usneoides* (e.g. proposed development sites 4 – 8 and 10 – 11).

Three plant communities were encountered namely:

- A sparse (semi-desert type) low shrubland with grasses sometimes present (that will be more prominent and even dominating after rain) on the open undulating plains (Refer to the proposed development sites 1-3 and 9).
- A denser and higher riparian vegetation was encountered next to the watercourses. The more pronounce these water courses the more established the riparian zone became.
- Sparse woodland dominated by magnificent trees was encountered in the deeper sandy soils next to the Hartbees River.

Because of the arid nature of the region (and the unpredictability of rainfall) the carrying capacity of the veld is very low and much of the natural veld has suffered from incorrect grazing or overgrazing practices since the early 19th century (after farms became fenced).



Figure 24: Google Earth Map showing the various sites assessed during the botanical assessment.

Area1-

Site 1 is located on the western edge of the larger study area the furthest away from the Hartbees River. The proposed site can be described as a low undulating plain, demarcated by small seasonal water courses. The water courses are associated with a definite riparian zone of medium to large shrubs to tall trees at its northern boundary. The layout of the proposed site aims to minimise the impact on these water courses and will not impose on the riparian zone.

The vegetation encountered can be described as a low sparse shrubland, which is most likely to be dominated by a dense grassy layer after good rains. At the time of the study the grassy layer was, however, almost absent. The shrub layer was mostly dominated by the succulent *Mesembryanthemum coriarium* (= *Psilocalon coriarium*), but also included species like *Acanthopsis disperma* (Halfmensie), *Aptosimum spinescens*, *Anacampseros papyracea*, *Blepharis mitrata*, *Boscia albitrunca* (occasionally), *B. foetida* (about 20 individuals), *Cynanchum viminalis*, *Justicia australis* (= *Monechma genistifolium*), *Justicia incana*, *Kewia salsoloides* (= *Hypertelis salsoloides*), *Kleinia longiflora*, *Lycium cinereum*, *Parkinsonia africana*, *Rhigozum trichotomum*, *Rogeria longiflora*, *Caroxylon cf. aphyllum*, *Senegalia mellifera* and the aerial hemiparasite *Tapinanthus oleifolius*.

The riparian vegetation associated with the small seasonal streams surrounding the proposed development site was for the most part dominated by *Senegalia mellifera* (Swarthaak) with the following species also commonly found namely, *Asparagus cf. cooperi*, *Boscia albitrunca*, *B. foetida*, *Justicia australis*, *Kleinia longifolia*, *Lasiopogon micropoides*, *Lessertia macrostachya*, *Lycium cinereum*, *Parkinsonia africana*, *Stipagrostis namaquensis*, *Rhigozum trichotomum*, *Thesium lineatum*, *Vachellia erioloba*, *Viscum capense* (within the *Lycium*) and *Ziziphus mucronata*.

A number of protected trees, namely *Vachellia erioloba* as well as *Boscia foetida* trees, were encountered within or very near to the site. Fortunately, none of these should have to be removed.

Area 2, 3 and 9 -

The vegetation encountered on site 2, 3 and 9 is similar to that found at site 1 with the following differences. Most of the proposed site 2 will be located on an area previously used for raising ostrich chicks. As a result, the sites are heavily degraded and almost devoid of any vegetation. However, the original vegetation (from the remaining and surroundings) would have been the same as that of site 1.

Site 2, like site 1 and 3 was mostly dominated by *Mesembryanthemum coriarium* (= *Psilocalon coriarium*), in combination with *Rhigozum trichotomum* and *Senegalia mellifera*. However, there were also patches dominated by *Caroxylon cf. aphyllum* in combination with *Senegalia mellifera*.

Between site 2, 3, 4 and 5, a rocky area was encountered, with a number of small rocky outcrops. Since this area is not considered for development it was not investigated as part of this study.

The vegetation cover of the proposed site 3 was mostly much higher than that of site 1, but the species and species composition was generally the same. However, 4 protected trees (one of which was dead) were encountered within the site, and a further 3 just to the north-east of the site.

The proposed site 9, was generally much degraded, with a low cover of natural veld left. The remaining vegetation was dominated by *Rhigozum trichotomum*, *Mesembryanthemum coriarium* (= *Psilocalon coriarium*) and *Senegalia mellifera*. Three *Boscia albitrunca* trees were also observed in this site.

Area 4 – 8, and 10 - 11

The remaining areas identified for potential development is all located in the deeper sandy soils in the old floodplains of the Hartbees River. The vegetation can be described as sparse woodland, dominated by magnificent *Vachellia erioloba* (Camel thorn) trees in its top stratum. The lower shrub layer was either dominated by *Senegalia mellifera* in combination with *Caroxylon cf. aphyllum* or *Senegalia mellifera* in combination with *Mesembryanthemum coriarium* or sometimes by the hardy and ecologically important grass, *Stipagrostis namaquensis*.

Other plants observed, in between the open tree canopy, includes: the tall shrubs *Lycium cinereum* and *Lycium bosciifolium*, *Ozoroa dispar* (occasionally), scattered individuals of the small tree *Parkinsonia africana*, the small trees *Senegalia mellifera*, the smaller shrubs, *Augea capensis*, *Caroxylon cf. aphyllum*, *Chascanum garipense*, *Grielum humifusum*, *Justicia australis*, *Kleinia longifolia*, *Mesembryanthemum coriarium*, *Stoeberia arborea*, *Tetraena retrofracta*, *Thesium lineatum* and *Tribulus terrestris* (dubbeltjie).

The vegetation in the proposed site 4 and 5 are very much as described as above, apart from the fact that the *Vachellia erioloba* tree layer is not well established (soils probably too shallow) and they are only found near the seasonal water course that runs between the sites (and which will be protected as part of the seasonal stream). The protected trees encountered will not be harmed.

The vegetation encountered in site 6 and 7 confirms to the description given at the beginning of this section, with scattered individuals of *Vachellia erioloba*, and even the occasional *Euclea pseudebenus* and *Tamarix usneoides* encountered.

Although site 6 and 7 were chosen to minimise the impact on seasonal water courses, a number of larger protected trees are still located within the proposed agricultural areas. As noted in the botanical assessment, the owner has indicated that he would like to protect all significant indigenous trees (as he has done in all his other developments on this farm) by incorporating them into his fields without removing them.

The remaining vegetation of site 8 also confirms to the description for this area, with the occasional *Vachellia erioloba* encountered. Please note that a large portion of this site has already been cultivated.

The proposed site 10 refers to an area that has been impacted by many construction-related activities in the past, which might include sand mining river protection actions. Apart from the poor physical state it is also characterised by dense stands of *Prosopis* trees. Again, the most significant aspect of this area is the remaining protected tree species.

The proposed site 11 was most likely ploughed in times past and presently only supports hardy pioneer species like *Caroxylon* cf. *aphyllum* (= *Salsola aphylla*), *Mesembryanthemum coriarium* (= *Psilocaulon coriarium*), *Mesembryanthemum guerichianum* and *Stoeberia arborea*.

- **Critical Biodiversity Areas**

The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

Critical biodiversity areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI 2007). The primary purpose of CBA's is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. CBA's can also be used to inform protected area expansion and development plans.

- Critical biodiversity areas (CBA's) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.
- Ecological support areas (ESA's) are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting

the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas.

The 2016 Northern Cape Critical Biodiversity Areas (NCCBA) gives both aquatic and terrestrial Critical Biodiversity Areas (CBAs) and ecological support areas for the Northern Cape.

According to the NCCBA (see Figure 25 below), the proposed development will be located within a terrestrial CBA.

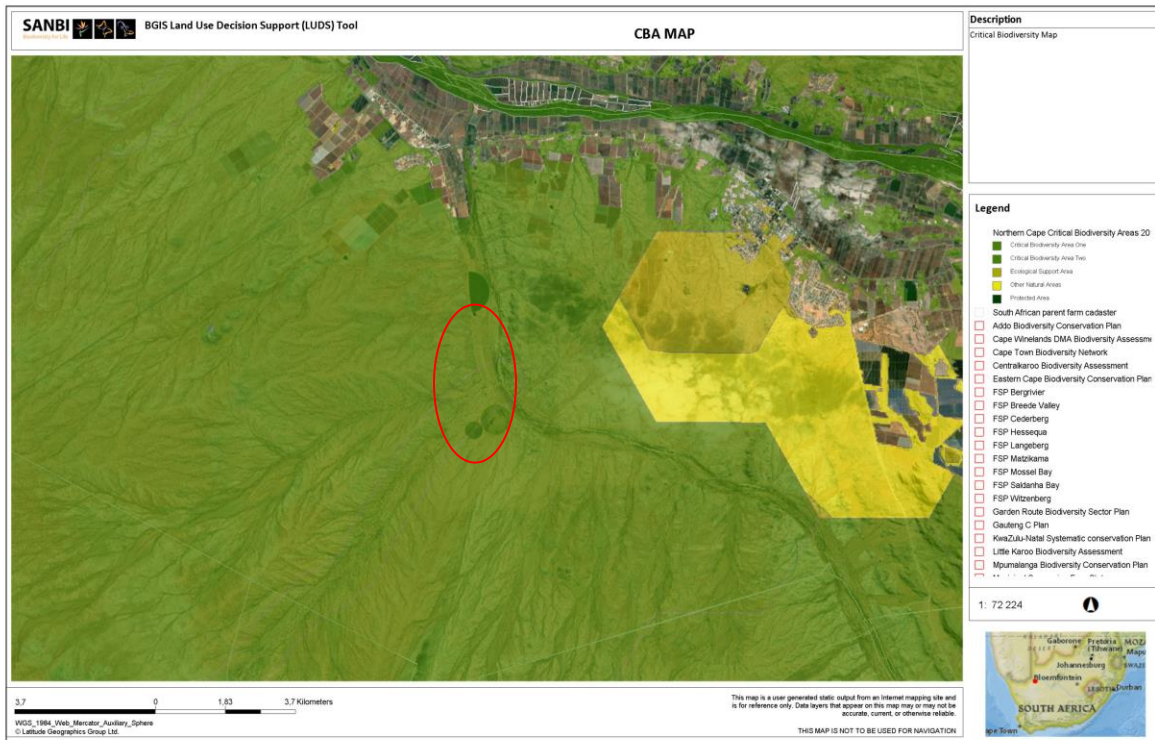


Figure 25: The Northern Cape Critical Biodiversity Areas (2016) showing the location of the proposed development

- **Centres of Endemism**

The proposed development does not impact on any recognised centre of endemism. The Gariep Centre is located to the north (quite a distance away) associated with Augrabies, Pella and Onseepkans along the border of South Africa and Namibia, while the Griqualand West Centre of Endemism starts to the east of Upington Northern Cape Province. The proposed site does not fall within any recognised centre of endemism.

- **Flora Encountered**

Please refer to Table 5, page 20 of the Botanical Impact Assessment (**Appendix 5A**), for the list of species encountered within the development area.

- **Threatened and Protected Plant Species**

In the Northern Cape, species of conservation concern are also protected in terms of national and provincial legislation, namely:

- The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the “*Lists of critically endangered, endangered, vulnerable and protected species*” (GN. R. 152 of 23 February 2007).
- National Forest Act, Act 84 of 1998, provides for the protection of forests as well as specific tree species through the “*List of protected tree species*” (GN 908 of 21 November 2014).
- Northern Cape Nature Conservation Act, Act of 2009, provides for the protection of “*specialty protected species*” (Schedule 1), “*protected species*” (Schedule 2) and “*common indigenous species*” (Schedule 3).

Red list of South African plant species – No Red-listed species were observed

NEM:BA protected plant species - The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the “*Lists of critically endangered, endangered, vulnerable and protected species*” (GN. R. 152 of 23 February 2007). No NEM: BA protected species was observed.

NFA Protected plant species - The National Forests Act (NFA) of 1998 (Act 84 of 1998) provides for the protection of forests as well as specific tree species (as updated). Three species protected in terms of the NFA was observed, namely *Boscia albitrunca* (Sheppard’s tree), *Euclea pseudebenus* (Ebony Quarry / Wild-ebony), and *Vachellia erioloba* (Camel Thorn). Please refer to Table 6 of the Botanical Assessment.

NCNCA protected plant species - The Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect on the 12th of December 2011, and also provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1 and 2 of the act give extensive lists of specially protected and protected fauna and flora species in accordance with this act. NB. Please note that all indigenous plant species are protected in terms of Schedule 3 of this act (e.g. any work within a road reserve). A number of species protected in terms of the NCNCA were encountered. Please refer to Table 7, page 23 of the Botanical Impact Assessment (**Appendix 5A**).

10.1.2 IMPACT ASSESSMENT

According to the Botanical Impact Assessment (**Appendix 5A**), the main impacts associated with the proposed development will be the potential impacts associated with conservation priority areas (the

site falling within a proposed CBA) and protected and endangered plant species (national and provincially protected species), especially protected tree species, which can result in a Medium/High impact.

The cumulative impact is also expected to be Medium/High and it is important that mitigation measures are implemented in order to reduce the potential environmental impact to a potential Medium/Low significance.

10.1.3 MITIGATION MEASURES

The following mitigation actions should be implemented to ensure that the proposed development does not pose a significant threat to the environment:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies.
- An application must be made to DENC for a flora permit in terms of the NCNCA with regards to impacts on species protected in terms of the act.
- Conservation of Nationally protected tree species (Refer to Table 2 – Table 4 & Table 6 of Appendix 5A):
 - ***Vachellia erioloba*** (Trees taller than 6m): No tree larger than 6m may be removed or damaged. Development footprints must stay at least further than 1 m of the canopy (or drip line) of any such tree.
 - ***Vachellia erioloba*** (Trees smaller than 6m): All mature trees should be protected wherever possible and removal may only be considered as a last resort (with approval in terms of the NFA). Immature trees (<3m) should also be protected, if possible, but may be considered for removal (with approval in terms of the NFA). Dead trees can be removed (with approval in terms of the NFA).
 - ***Boscia albitrunca***: All mature trees in good condition should be protected and removal may only be considered as a last resort. Small immature trees or badly damaged trees may be considered for removal (with approval in terms of the NFA).
 - ***Euclea pseudobenus***: Only a few wild-ebony trees were observed. They should be protected (even if they have to be incorporated within the agricultural land. Development footprints must stay at least further than 1 m of the canopy (or drip line) of any such tree.
 - An application must be made to Department of Forestry and Fisheries for a permit in terms of the NFA with regards to impacts on species protected in terms of the act.
- Conservation of provincially protected plant species (NCNCA):
 - Search & rescue operation must be implemented for individual plants that might be impacted as recommended in Table 7 of Appendix 5A.
 - An application must be made to DENC for a flora permit in terms of the NCNCA with regards to impacts on species protected in terms of the act.
- Access must be limited to routes approved by the ECO.
- Before any work is done the site and access routes must be clearly demarcated (with the aim at minimal width/smallest footprint). The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.

- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- Special attention must be given to alien and invasive control within the construction footprint. All alien invasive species within the footprint and at least 5 m to the side of the footprint must be removed responsibly.
 - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the AIP due to incorrect eradication methods);
 - Care must be taken to dispose of alien plant material responsibly.
- Indiscriminate clearing of any area outside of the construction footprint must be avoided.
- All areas impacted as a result of construction must be rehabilitated on completion of the project.
 - This includes the removal of all excavated material, spoil and rocks, all construction related material and all waste material.
 - It also included replacing the topsoil back on top of the excavation as well as shaping the area to represent the original shape of the environment.
- An integrated waste management approach must be implemented during construction.
 - Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
 - All rubble and rubbish should be collected and removed from the site to a suitable registered waste disposal site.

According to the Botanical Impact Assessment (**Appendix 5A**), the following species are protected in terms of the NCNCA were encountered. Recommendations on impact minimisation also included.

Table 3: Plant species protected in terms of the NCNCA encountered within the study area

	SPECIES NAME	COMMENTS	RECOMMENDATIONS
1.	<i>Boscia albitrunca</i> Schedule 2 protected	Occasionally observed.	Preferably not to be disturbed: The few larger individuals should be easy to avoid. However a few smaller individuals might be impacted. A NFA permit will be required as well as a NCNCA permit.
2.	<i>Boscia foetida</i> Schedule 2 protected	Commonly observed. However, they were mostly stumped or small species.	Search & rescue: Individuals within footprint to be transplanted to surrounding area.
3.	<i>Cynanchum viminale</i> Schedule 2 protected	Occasionally observed.	Larger <i>Cynanchum</i> plants are expected to transplant poorly. Species protection through topsoil conservation.
4.	<i>Mesembryanthemum coriarium</i> Schedule 2 protected	This plant is weedy a disturbance indicator occasionally observed.	No special measures needed, this is a weedy pioneer species.
5.	<i>Mesembryanthemum guerichianum</i> Schedule 2 protected	This plant is weedy a disturbance indicator occasionally observed.	No special measures needed, this is a weedy pioneer species.
6.	<i>Stoeberia arborea</i> Schedule 2 protected	Commonly found in disturbed areas	No special measures needed, this is a weedy pioneer species.

10.1.4 CONCLUSION

The proposed development will result in the permanent transformation of approximately 200ha of natural veld to intensive agriculture. According to the impact assessment, with good environmental control, the development is likely to result in a **Medium/Low** impact on the environment.

With the correct mitigation it is considered highly unlikely that the proposed development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

Having evaluated the proposed site and its immediate surroundings, it is unlikely that the proposed development will lead to any significant impact on the botanical features as a result of its placement as long as the following impact minimisation recommendations are implemented.

10.2 HERITAGE IMPACT ASSESSMENT

Jan Engelbrecht of Ubique Heritage Consultants was appointed to undertake a Heritage Impact Assessment (HIA) of the proposed site. The HIA is included as **Appendix 5B**.

10.2.1 KEY FINDINGS

The following heritage resources were identified in the Heritage Impact Assessment (Appendix 5B):

- Archaeological features

Three occurrences of lithic material were recorded across the surveyed area of Plot 2372, None of the lithic locations is situated within a development footprint, and only one recorded lithic assemblage was near areas earmarked for agricultural development, and which may be negatively impacted upon by the development. The lithics recorded at the three locations on Plot 2372 are however without archaeological context and are deemed of minor importance, and impact from the development will be inconsequential.

Two occurrences of colonial period material were recorded on Plot 2372. An isolated hole-in-cap tin lid with a date range of the 1850s- 1920s was found on a development footprint, while a collection of cast-iron potsherds and a tin can with folded/ crimped hand soldered seam (dated 1850-1880s) were recorded in proximity of a development footprint. Although the material could be useful in determining occupation dates and are located within, and borders development footprints, the material sample is small and without archaeological context. The development impact on these resources is therefore inconsequential.

These sites are given a 'General' Protection C (Field Rating IV C). This means these sites have been sufficiently recorded (in Phase 1). It requires no further action.

Approximately 600m to the east of the southernmost development footprint on Plot 1763, a palimpsest of surface scatters associated with various time periods were recorded in a small area of outcrops. The remains of what may be a stone-walled small live-stock kraal are also situated on top of the largest of these outcrops. Three incidents of lithics were recorded, one high-density scatter situated 30 m north of the stone kraal remains at the top of the larger outcrop, and two low-density scatters to the south-east, amongst smaller outcrops. The lithic assemblages consist of surface scatters of very few formal tools, predominantly untrimmed flakes, cores, stone working debris, and few scrapers made from dolerite, banded ironstone formation, and quartzite. The type of lithics present points to the utilisation of the area as a probable knapping site by prehistoric people.

The cultural material shows various degrees of weathering and is a combination of LSA and MSA artefacts, either representative the Early Later Stone Age, or of long-term usage spanning both the LSA and MSA (Lombard 2011). A few sherds of indigenous low fired, thin-walled, mineral tempered ceramics associated with hunters-with-livestock/herders (Mitchell 2002; Lombard & Parsons 2008) were also recorded. The presence of the stone tools and ceramics might indicate an association between the stone kraal and Khoi groups inhabiting the area or be coincidental as historical cultural material was also recorded in the area. A dateable tin can with folded/ crimped hand soldered seam (1850-1880s), were found with undiagnostic glass, sherds of cast-iron pot, a horseshoe, and piece of whiteware ceramic

This area is deemed medium to high significance due to the density and range of artefacts on the surface and the repeated utilisation of the landscape through consequent periods. It lies outside the current development footprint, and even though the proximity to the development does raise some concern, it is not in any immediate danger from the development.

The area is of high/medium significance and receives a 'General' Protection A (Field Rating IVA). These sites should be avoided or mitigated before any future development are planned and might take place in this area.

- Graves

No formal or informal graves were identified in the study area.

- Palaeontological resources

The proposed development is underlain by the Riemvasmaak Gneiss and Vyfbeker Metamorphic Rocks of the Namaqua-Natal Province and a very small portion in the north of the proposed development is underlain by the Riemvasmaak Gneiss. The Riemvasmaak Gneiss and Vyfbeker Metamorphic Rocks is igneous rocks and the potential for any fossil materials occurring within this rock unit is thus zero (Butler 2019). Elize Butler from Banzai Environmental proposes exemption from doing a full paleontological study for this project.

10.2.2 IMPACT ASSESSMENT

Since no archaeological, historical or cultural sites that will be impacted on negatively by the proposed development, the impact of the proposed development on heritage resources is considered negligible

10.2.3 MITIGATION MEASURES

According to the Heritage Impact Assessment (**Appendix 5B**), based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

- No significant heritage sites or features were identified within the development footprint. No further mitigation is required. Therefore, from a heritage point of view we recommend that the proposed development can continue.
- The series of outcrops to the south-east of the development footprint are of medium to high significance. Currently no developments are planned for this area, therefore no mitigation is necessary at present. It should be noted that if any future developments are considered, mitigation of these sites should be undertaken. Mitigation should include comprehensive mapping and recording of the sites. Furthermore, these areas should be considered as archaeologically sensitive, and the owners and developers should be aware of the impact construction vehicles and recreational vehicles could have on these heritage resources.
- Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).
- Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

10.2.4 CONCLUSION

The Heritage Impact Assessment (**Appendix 5B**), identified no heritage resources on Plot 1763, 2372, and 2363 Kakamas South Settlement, Kai !Garib Municipality, Mgcawu District Municipality, Northern Cape that will be impacted on negatively by the proposed development.

10.3 FRESHWATER ASSESSMENT

Dr Dirk van Driel (Watsan Africa) has been appointed to undertake the Freshwater Assessment of the proposed site and the Water Use Licence Application – The Freshwater Report is included as **Appendix 5C**.

10.3.1 KEY FINDINGS

The agricultural development is located on the bank of the Hartbees River. The Hartbees River rises as the Sak River on the highlands to the south of Sutherland more than 450km to the south.

The catchment area of this river system is large and covers a sizable chunk of the Bushmanland and the western Karoo.

A series of pans separate the Sak River from the Hartbees River. Verneukpan is perhaps the one that is better known because the historical land speed record was set there. The Hartbees River only flows when these pans overflow. This happened in 1999 and in 2010. It is expected that these overflows will occur less often in future as water abstraction from the Sak River for agriculture increases.

It is however important to note that the Sak River do not contribute towards the Mean Annual Runoff (MAR) of the Orange River.

This is an arid region and its contribution is negligible. The flow of the Orange River is mainly because of the contribution of the Lesotho Highlands.

The banks of the Hartbees River have been impacted since historical times, with agriculture leaving its mark. At this time there are several active agricultural concerns. In addition, there are several sand mines, some in the bed of the river, which are reportedly legally licenced entities.

- Drainage Lines

The landscape around much of the Lower Orange River and the Sak River is dominated by a dense succession of drainage lines. They spread along the river with many smaller tributaries to cover the entire area. The iron oxides in the sands renders a red hue that is visible from space on the Google Earth images. These reds are concentrated in the drainage lines, making them even more visible.

The drainage lines are mostly dry, with water only during rains and perhaps shortly thereafter. During the odd thunderstorm, drainage lines can come down in flood. These floods maintain the drainage line's morphological integrity, as sediments are moved and these water ways are scoured out. Because rainfall events are far apart, the drainage lines must have been form over millennia, even since geological times.

Around the Orange River and even the Sak River, large-scale agriculture has changed the drainage lines into drainage channels among the vineyards and orchards. The upper reaches away from the rivers are less impacted, even near-pristine, as intense agriculture is not possible, apart from those areas where water is piped over long distances from the Orange River.

- Drainage lines on the property

Next to the farm road along the Hartbees River, the drainage lines fan out to connect to one another in a broad and continuous fan, interconnected, with no visual demarcation between drainage lines. This is visible on Google Earth Images, as well as on the ground. During rainfall events, storm water spreads out all over, in a braided fashion, and the flow of water migrates sideways, left and right, to create this continuous fan of braided drainage lines.

The drainage lines only have water during very large rainfall events. Most of the time the drainage lines are dry, for months and even years on end.

The slope of sub-catchments 1 and 2 is very gradual. The slopes of sub-catchments 3 to 6 are much steeper, with 6 the steepest. It can be expected that steep slopes and large catchment areas will result in high velocities of surface water movement during rainfall events. None of these drainage lines are deeply incised. It seems as if the surface area combined with the slope in none of these sub-catchments result in sediment transport of a large enough volume to create proper water course banks. Instead the drainage lines fan out over a wide area, in some places up to 100m wide, with gradual banks.

In the area across the farm road from the half-circle centre pivot, a number of these drainage lines can be seen, where they come out of the bush, over the road and then into the irrigated maize field, where they disappear. These drainage lines are small, with signs of a little sediment erosion and deposition, because of the rain the previous two days. In Kakamas 45mm was recorded. The site visit was on 7 February 2019.

The drainage line next to the full circle centre pivot (planted with lucerne) is much wider. The one at the end of the pecan nut orchard is deeper, up to a metre, with a stronger defined channel. It was dry despite after the rain, a sign that the preferential flow paths have shifted.

Further on, adjacent to the full circle centre pivot, the drainage line is some 40m wide, still wet because of the rain, with wet soil because of the rain and with signs of moving sediments.

10.3.2 IMPACT ASSESSMENT

According to the Freshwater Assessment (**Appendix 5C**), the proposed agricultural development would inevitably destruct the affected sections of the drainage lines. This is essentially the decision that the authorities will have to take; the tilling of new land and the resulting destruction of some sections the drainage lines as opposed to the preservation of these drainage lines. If the preservation of drainage lines rules out agricultural development, any further impact assessment and the further pursuance of a WULA would be ruled out. Hence the following assessments have been carried out under the assumption that some sections of drainage line will suffer destruction with the consent of the authorities. The destruction of these sections of drainage lines is not included in this assessment. This peculiar situation always faces assessors when habitat is destroyed in favour of development.

The impact assessment (Table 4) suggest that the mitigation measures can be implemented successfully. It suggests that the proposed development can go ahead, without unacceptable impacts outside of the agricultural development.

Table 4: Freshwater Impact Assessment Summary

Possible Impact		Extent	Duration	Intensity	Significance	Probability	Confidence
Tilling of new land, washing of soil down the drainage lines and into the Hartbees River during a storm event. Construction of berms, drainage swales and storm water management infrastructure. Construction of irrigation infrastructure	Without mitigation	Regional	Medium term	Medium	Medium	Probable	High
	With mitigation	Local	Short term	Low	Low	Low	Medium/High
Operation of new farming venture Irrigation of crops	Without mitigation	Regional	Medium term	Medium	Medium	Probable	High
	With mitigation	Local	Short term	Low	Low	Low	Medium/High

10.3.3 MITIGATION MEASURES

The following mitigation measures pertaining to the drainage line are recommended:

- The land outside of the indicated agricultural development patches should be left unimpacted as much as possible. Should any of this be developed in future, it must be done following proper official approval procedures in terms of current legislation.
- Storm water should be diverted around worked agricultural land with berms, or contained in formalised channels through agricultural land. Erosion should be addressed as soon as it becomes evident.
- Storm water infrastructure should be regularly monitored and repaired whenever necessary.
- The bank of the Hartbees River and its riparian zone, where impacted upon, should be restored according to an officially approved plan.
- The sand mine in the bottom of sub-catchment 1 should be legitimised or restored.
- Agricultural return flow as a result of over-irrigation should be avoided at all costs. The Hartbees River is mostly and naturally dry and should remain that way. Contemporary farming practices and the cost of energy and irrigation are extremely high, with serious inroads on profitability, hence soil moisture should be telemetrically monitored with sophisticated instruments and the irrigation regime perpetually and accordingly adjusted.
- The access road should be maintained and not be allowed to become a source of sediments that could end up along with storm water in the Hartbees River. Any signs of erosion of the road should be adequately addressed.

10.3.4 CONCLUSION

An anthropogenic activity can impact on any of the ecosystem drivers or responses and this can have a knock-on effect on all of the other drivers and responses. This, in turn, will predictably impact on the ecosystem services. The WULA and the EIA must provide mitigation measured for these impacts.

The driver of the mostly dry drainage lines is the occasional flood that follows sudden and intense rainfall events. This is followed by prolonged droughts and intense summer heat that prevents the development of any viable aquatic habitat. This is apart from shallow ground water that explains the growth of vegetation along the drainage lines that provides habitat in an arid region where habitat and habitat variability is hard to come by.

The conservation of drainage lines along the Lower Orange River deserves and demands attention by decision-making authorities, environmental practitioners, the conservation and farming community alike. As more of these drainage lines are impacted upon, and because impacts are radical by nature, because sections of drainage lines are replaced by vineyards or other forms of agriculture, or transformed into return flow infrastructure, the necessity for a widely accepted conservation policy becomes urgent as development escalates.

A percentage of still unimpacted drainage lines should be identified, prioritised and set aside for conservation. Only specified practices with no or limited impacts should be allowed in these sub-catchments and their drainage lines.

It remains for the decision-making authorities to decide if the proposed agricultural developments in the Lower Hartbees River are acceptable and if they should go ahead. Since impacts are already evident and since a vast amount of money has already been invested in this venture, with many job opportunities at stake, the proposed development should go ahead, but the eminent approval would increase the urgency and pressure for a known and accepted Lower Orange River Drainage Lines conservation policy.

11. SUMMARY OF IMPACTS

Please refer to Appendix 6 for a summary of the project impact assessment and significance, including a summary of mitigation measures.

Table 5 is a summary of all the impacts assessed in the specialists reports that are associated with the construction and operational phase for the preferred alternative.

Table 5: Summary of all impacts

Study	Impact	Significance No Mitigation	Significance With Mitigation
Botanical	Geology & soils: Potential impact on special habitats (e.g. true quartz or "heuweltjies")	High (Negative impact)	Low (Negative impact)
	Landuse and cover: Potential impact on socio-economic activities.	Medium (Negative impact)	Low (Negative impact)
	Vegetation status: Loss of vulnerable or endangered vegetation and associated habitat.	High (Negative impact)	Low (Negative impact)
	Conservation priority: Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	High (Negative impact)	Medium (Negative impact)
	Connectivity: Potential loss of ecological migration corridors.	High (Negative impact)	Low (Negative impact)
	Protected & endangered plant species: Potential impact on threatened or protected plant species.	High (Negative impact)	Medium (Negative impact)
	Invasive alien plant species: Potential invasive plant infestation as a result of the activities.	Medium (Negative impact)	Low (Negative impact)
	Veld fire risk: Potential risk of veld fires as a result of the activities.	Low (Negative impact)	Insignificant (Negative impact)
	Cumulative impacts: Cumulative impact associated with proposed activity.	Medium High (Negative impact)	Medium Low (Negative impact)
	The "No-Go" option: Potential impact associated with the No-Go alternative.	Low (Negative impact)	

Heritage	Loss of Heritage resources	Negligible (Negative impact)	No Impact
Palaeontology	Loss of Palaeontological heritage resources	No Impact	No Impact
Freshwater	Clearing of vegetation, levelling of land	Medium (Negative impact)	Low (Negative impact)
	Drainage Line reconstruction	Medium (Negative impact)	Low (Negative impact)
	Installation of infrastructure, irrigation	Medium (Negative impact)	Low (Negative impact)
	Operation of vineyards	High (Negative impact)	Low (Negative impact)
Social	Job Creation	Low (Positive Impact)	N/A

12. RECOMMENDATIONS

The following mitigation measures must be enforced if the proposed development were approved. These are also included in the Environmental Management Programme (**Appendix 7**).

Construction and Operational Phases:

The following mitigation actions should be implemented to ensure that the proposed development does not pose a significant threat to the environment:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies.
- An application must be made to DENC for a flora permit in terms of the NCNCA with regards to impacts on species protected in terms of the act.
- Conservation of Nationally protected tree species (Refer to Table 2 – Table 4 & Table 6 of Appendix 5A):
 - ***Vachellia erioloba*** (Trees taller than 6m): No tree larger than 6m may be removed or damaged. Development footprints must stay at least further than 1 m of the canopy (or drip line) of any such tree.
 - ***Vachellia erioloba*** (Trees smaller than 6m): All mature trees should be protected wherever possible and removal may only be considered as a last resort (with approval in terms of the NFA). Immature trees (<3m) should also be protected, if possible, but may be considered for removal (with approval in terms of the NFA). Dead trees can be removed (with approval in terms of the NFA).
 - ***Boscia albitrunca***: All mature trees in good condition should be protected and removal may only be considered as a last resort. Small immature trees or badly damaged trees may be considered for removal (with approval in terms of the NFA).
 - ***Euclea pseudebenus***: Only a few wild-ebony trees were observed. They should be protected (even if they have to be incorporated within the agricultural land. Development footprints must stay at least further than 1 m of the canopy (or drip line) of any such tree.
 - An application must be made to Department of Forestry and Fisheries for a permit in terms of the NFA with regards to impacts on species protected in terms of the act.
- Conservation of provincially protected plant species (NCNCA):
 - Search & rescue operation must be implemented for individual plants that might be impacted as recommended in Table 7 of Appendix 5A.
 - An application must be made to DENC for a flora permit in terms of the NCNCA with regards to impacts on species protected in terms of the act.
- Access must be limited to routes approved by the ECO.
- Before any work is done the site and access routes must be clearly demarcated (with the aim at minimal width/smallest footprint). The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.

-
- Special attention must be given to alien and invasive control within the construction footprint. All alien invasive species within the footprint and at least 5 m to the side of the footprint must be removed responsibly.
 - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the AIP due to incorrect eradication methods);
 - Care must be taken to dispose of alien plant material responsibly.
 - Indiscriminate clearing of any area outside of the construction footprint must be avoided.
 - All areas impacted as a result of construction must be rehabilitated on completion of the project.
 - This includes the removal of all excavated material, spoil and rocks, all construction related material and all waste material.
 - It also included replacing the topsoil back on top of the excavation as well as shaping the area to represent the original shape of the environment.
 - An integrated waste management approach must be implemented during construction.
 - Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
 - All rubble and rubbish should be collected and removed from the site to a suitable registered waste disposal site.

According to the Heritage Impact Assessment, based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

- No significant heritage sites or features were identified within the development footprint. No further mitigation is required. Therefore, from a heritage point of view we recommend that the proposed development can continue.
- The series of outcrops to the south-east of the development footprint are of medium to high significance. Currently no developments are planned for this area, therefore no mitigation is necessary at present. It should be noted that if any future developments are considered, mitigation of these sites should be undertaken. Mitigation should include comprehensive mapping and recording of the sites. Furthermore, these areas should be considered as archaeologically sensitive, and the owners and developers should be aware of the impact construction vehicles and recreational vehicles could have on these heritage resources.
- Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).
- Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

The following mitigation measures pertaining to the drainage line are recommended:

- The land outside of the indicated agricultural development patches should be left unimpacted as much as possible. Should any of this be developed in future, it must be done following proper official approval procedures in terms of current legislation.
- Storm water should be diverted around worked agricultural land with berms, or contained in formalised channels through agricultural land. Erosion should be addressed as soon as it becomes evident.
- Storm water infrastructure should be regularly monitored and repaired whenever necessary.
- The bank of the Hartbees River and its riparian zone, where impacted upon, should be restored according to an officially approved plan.
- The sand mine in the bottom of sub-catchment 1 should be legitimised or restored.
- Agricultural return flow as a result of over-irrigation should be avoided at all costs. The Hartbees River is mostly and naturally dry and should remain that way. Contemporary farming practices and the cost of energy and irrigation are extremely high, with serious inroads on profitability, hence soil moisture should be telemetrically monitored with sophisticated instruments and the irrigation regime perpetually and accordingly adjusted.
- The access road should be maintained and not be allowed to become a source of sediments that could end up along with storm water in the Hartbees River. Any signs of erosion of the road should be adequately addressed.

13. CONCLUSIONS

The following specialist studies were undertaken as part of this Environmental Impact Assessment:

- ❖ Botanical Impact Assessment
- ❖ Heritage Impact Assessment
- ❖ Freshwater Impact Assessment

The specialist studies and the information provided within the EIA Report, indicates that the proposed agricultural development does not pose any significant impacts and can be implemented with appropriate mitigation.

In terms of the need and desirability of the proposed development, the town of Kakamas is in need for a new Wastewater Treatment Works, since the existing treatment works does not have sufficient capacity and is aging. The Kai !Garib Municipality has therefore proposed a new Waste Water Treatment Works that will have sufficient capacity to service Kakamas. The treated effluent would however need to be disposed of, or utilised. One option is to use the treated effluent for irrigation.

The proposed location for the WWTW is on Erf 236, owned by the Verneujk Pan Trust. In agreement with the Kai !Garib Municipality, in exchange, the Verneujk Pan Trust would receive the treated effluent, which would have sufficient volume to irrigate approximately 200ha of crops.

Although exact figures are still to be determined, the proposed development is expected to create significant jobs opportunities during the construction and operational phases, with a majority of the job opportunities going towards previously disadvantaged individuals.

The proposed location is considered to be ideal, as it is in relatively close proximity to the source of water, the proposed Kakamas WWTW (3km). The site is also ideally situated in that its elevation is below that of the proposed Kakamas WWTW, thereby relying more on gravity and not on pump stations. The site is adjacent to existing similar crops (centre pivot irrigation areas, and pecan nuts). The site also has easy access from the N14.

Soil studies conducted also found that the proposed soils were of Medium to High potential for the establishment of perennial crops.

The proposed activity, and site is compatible with the surrounding area. The area, particularly along the Orange River is known for its agriculture and crop production, particularly grape production (wine, table and raisin grapes) although pecan nut, corn and lucerne is also common. The sites are adjacent to existing lucerne and pecan nut crops. Agriculture is a predominant economic sector in the area.

In terms of alternatives, the proposed site and the activity are the only viable options for the Applicant at this stage, and as such, no further Alternatives were investigated.

The No-Go option is the option of not developing the area for additional irrigation and crop production. The current status quo will remain. Although this might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not developing the site for crop production

will not be realised. The jobs opportunities and expected contribution to the region's economy would not be realised.

Other means of disposing and/or utilising the treated effluent from the proposed Kakamas WWTW would then need to be investigated.

The no-go option would only be recommended if it were found that the proposed development on this site or in this area might potentially cause substantial detrimental harm to the environment.

According to the Botanical Impact Assessment, the proposed development will result in the permanent transformation of approximately 200ha of natural veld to intensive agriculture. According to the impact assessment, with good environmental control, the development is likely to result in a **Medium/Low** impact on the environment.

With the correct mitigation it is considered highly unlikely that the proposed development will contribute significantly to any significant loss of vegetation type and associated habitat, loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities, loss of local biodiversity and threatened plant species and loss of ecosystem connectivity.

Having evaluated the proposed site and its immediate surroundings, it is unlikely that the proposed development will lead to any significant impact on the botanical features as a result of its placement as long as the following impact minimisation recommendations are implemented.

According to the Freshwater Impact Assessment, since impacts are already evident and since a vast amount of money has already been invested in this venture, with many job opportunities at stake, the proposed development should go ahead, but the eminent approval would increase the urgency and pressure for a known and accepted Lower Orange River Drainage Lines conservation policy.

The Heritage Impact Assessment identified no heritage resources that will be impacted on negatively by the proposed development.

Considering all the information, it is not envisaged that this proposed agricultural development will have a significant negative impact on the environment, and the socio-economic benefits are expected to outweigh any negative impacts. The negative impacts can also be mitigated to a satisfactory degree.

It is therefore recommended that the proposed development be supported and be authorised with the necessary conditions of approval, subject to the implementation of the recommended enhancement and mitigation measures contained in Section 12.

14. DETAILS AND EXPERTISE OF THE EAP

Details of Environmental Assessment Practitioner, expertise and Curriculum Vitae

This Draft Environmental Impact Report was prepared by Clinton Geyser who has a MSc. Degree in Environmental Management. He has been working as an Environmental Assessment Practitioner since 2009 and is currently employed at EnviroAfrica CC.

Report compiled by Clinton Geyser -

Qualifications:

- BSc. Earth Sciences, Majors in Geology and Geography and Environmental Management (1998 – 2000) and;
- BSc. (hons): Geography and Environmental Management (2001) and;
- MSc. Geography and Environmental Management (2002), all from the University of Johannesburg.

Expertise:

Clinton Geyser has over ten years' experience in the environmental management field as an Environmental Assessment Practitioner and as an Environmental Control Officer, having worked on a variety of projects in the Western, Eastern and Northern Cape. Previous completed applications include, but not limited to:

- Civil engineering infrastructure including pipelines, Wastewater Treatment Works, and roads in the Western and Northern Cape.
- Agricultural developments, including reservoirs and dams, in the Western and Northern Cape.
- Telecommunications masts in the Western and Eastern Cape
- Housing Developments in the Western and Northern Cape.
- Resort developments in the Western and Northern Cape.
- Cemeteries in the Western Cape
- Waste Management Licences in the Western Cape

Employment:

Previous employment as an EAP: Doug Jeffery Environmental Consultants (2009 – 2012)

Current employment: EnviroAfrica cc (2012 – present).

The whole process and report was supervised by Bernard de Witt who has more than 20 years' experience in environmental management and environmental impact assessments.

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