



FINAL ENVIRONMENTAL SCOPING REPORT

**FOR THE CLEARANCE OF VEGETATION AND
CULTIVATION OF CROPS ON PORTION 1 OF THE FARM
HARRISDALE 226 (KILMOREY), BARKLY WEST DISTRICT,
NORTHERN CAPE.**

April 2019

Prepared by:



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Applicant:

Dorata (Pty) Ltd

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Site Information:

Farm / Erf Name	: Harrisdale
Farm Number	: 226
Farm Portion	: 1
21 Digit Surveyors Code	: C00700000000022600001
District	: Barkly West
District Municipality	: Francis Baard District Municipality
Local Municipality	: Dikgatlong Local Municipality
Site coordinates (Centre of site)	: - 28.492473° S and 24.655838° E

EXECUTIVE SUMMARY

Dorata (Pty) Ltd ("**the applicant**") seeks to apply for an Integrated Water Use License ("**IWUL**") with the Department of Water and Sanitation ("**DWS**") in terms of Sections 21(a), (c) and (i) of the National Water Act 36 of 1998 ("**NWA**") and Environmental Authorisation ("**EA**") with the Department of Environment and Nature Conservation ("**DENC**") in terms of the 2014 EIA Regulations as amended in 2017 ("**EIA Regulations**") under the National Environmental Management Act 107 of 1998 ("**NEMA**") for the clearance of more than 20ha of indigenous vegetation and the cultivation of crops on Portion 1 of the farm Harrisdale 226 ("**Kilmorey**"), Barkly West District, Northern Cape.

The applicant intends to produce Lucerne and Pecan Nuts on Kilmorey. The proposed agricultural development by the applicant seeks to cultivate and irrigate approximately 40 ha of Lucerne and plant 28 ha of Pecan Nut trees within 100 m of the Vaal River.

Wetland vegetation and soil samples were utilised to determine the presence and border of wetlands. The soil samples taken along the banks of the Vaal River are clearly indicative of wetland conditions on a perennial basis. The Vaal River and its banks are clearly defined and easily identifiable. The boundary of the floodplain is not easily identified due to previous transformation by centre-pivot irrigation although the riparian zone is still clearly defined (refer to the Ecological and Wetland Assessment in **Annexure 4**).

Abstraction of 1 104 000 m³ of water from the Vaal river through means of a submersible pump will be applied for in the IWULA. According to best practices to yield maximum production for Lucerne, 600 000 m³ are needed per annum, and for Pecan Nuts, 504 000 m³ of water per annum. The cultivation of the Lucerne and Pecan Nuts will be preceded by the clearance of 68 ha of indigenous vegetation. The area applied for ("**Study area**") was used for crop production in the past, more than 10 years ago, and the vegetation is classified as a secondary indigenous vegetation (mostly grasses). The irrigation of Lucerne will take place directly from the Vaal River through the means of a central pivot point using an overhead sprinkler system, together with the Pecan Nut trees which will use underground irrigation methods.

An IWULA will be made to the DWS to abstract a volume of 1 104 000 m³ water per year from the Vaal River to be used for irrigation purposes. The IWULA will include the following water uses in terms of Section 21 of the NWA:

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

Section 21 (c) and (i) will not be an attempt to impede, divert flow and/or alter the watercourse in any way. The NWA requires a Section 21 (c) and (i) to be completed when activities take place within 100 m of a watercourse and 500 m from a wetland area. The study area is located within 55 m of the Vaal River which contains a Wetland area.

EA will also be applied for with the DENC to authorise activity 25 of GN. R. 325 which reads as follows:

- "The clearance of an area of 20 ha or more of indigenous vegetation".

Alternatives

1. Location alternatives:

There is no feasible location alternative for this project that will be assessed due to the following reasons:

The area chosen for the proposed site is the only part of Kilmorey that can be used as no other land is available. Mining for diamonds on the property in the past also left the land to the east degraded and not suitable for the cultivation of Lucerne which needs moist topsoil to grow effectively. The proposed site has also been used in the past for pivot irrigation before mining took place. After mining ceased the study area was left to revegetate itself. Also, the surrounding properties do not belong to the same landowner and are already taken up by cultivated land. The remaining area surrounding the Lucerne cultivation area will not be left deserted and will be utilized towards the establishment of an orchard of Pecan Nut trees. Thus, no other location for the proposed site exists.

2. Design / Layout alternative:

The site has been cultivated in the past and has all the necessary infrastructure in place. This application simply seeks to continue (with EA) the agricultural activities on the same site before mining took place and left the study area abandoned. Certain aspects of the layout can be changed as the location of the pump in the Vaal River is not fixed. There is, however, a pump house located near the Vaal River which will be used and can be demolished and built on a new location close to the Vaal River. This, however, is very impractical since it will cost time and money to rebuild the pump house and loss of riparian vegetation will take place to make space for the new building. The pivot point can also be moved but will also be impractical due to the study area being of limited size together with the considerable time and money it will take to implement this change.

3. Technological alternative:

As far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment. Pivot and sprinkler irrigation systems will be used to irrigate the Lucerne crops which require large areas to be feasible. The pivot and sprinkler system are the only way

of effectively irrigating such a large area daily. The water will be abstracted from the Vaal River and directly fed to the pivot and the sprinklers, as storing the large amounts of water required daily by Lucerne is not feasible at the proposed site. Dry land farming is not a feasible alternative, due to the area which does not receive sufficient rainfall to support Lucerne. Lucerne needs large amounts of water for optimal production which is around 1 200 mm annually per hectare.

The Pecan Nut trees will also use water directly abstracted from the Vaal river. The preferred method for irrigating Pecan Nut trees makes use of underground wetting processes where irrigation lines are situated underground near the trees to directly wet the area containing the tree roots. This is the most practical method of irrigation for Pecan Nut trees as it optimizes the amount of water taken up by the trees and ensures minimal loss of water through evaporation. Also, heavy-duty rakes, pesticide sprayers and tree shakers are usually used during orchard management and harvesting.

4. No Go alternative:

The “no-go” alternative will be considered throughout the assessment of the proposed project. If the project cannot be authorised, no Lucerne and Pecan Nuts will be produced, which will lead to no creation of new jobs as well as losing an opportunity to boost the economy in the agricultural sector.

Baseline Assessments

A baseline site assessment was undertaken by Mr. Louis De Villiers to identify and assess any potential impacts associated with establishing the proposed project. This was followed by numerous discussions with specialists and the Applicant.

A desktop study was also undertaken to determine sensitive features on the site and in the surrounding environment.

Public Participation

The Public Participation Process (“PPP”) was conducted according to the EIA Regulations’ minimum requirements.

Comments, responses and proof of notifications sent during the PPP are included in Section 7 of this Scoping Report and **Annexure 3** attached.

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1 Introduction

This Scoping Report forms part of the Scoping and Environmental Impact Assessment ("**S&EIA**") process currently underway in accordance with the EIA Regulations. Apart from obtaining EA for the proposed project the purpose of the S&EIA process is to identify and assess all possible impacts which may occur as a result of the proposed activity and to propose mitigation measures to be implemented throughout all phases of the proposed project to prevent or limit the impacts which may occur.

1.1 Background to the Site

The study area, on the Kilmorey property, was initially used for the cultivation of crops in the past. The Kilmorey property, including a small portion of the study area and continuing to the East, was then utilized for mining purposes. After mining ceased the study area was left abandoned for at least 10 years allowing natural vegetation to regrow. The site consists mostly of natural vegetation though it is clear that a crop field including centre-pivot was present in the past. Therefore, the vegetation on the site, although indigenous, must be of secondary establishment. Notable impacts on the site include the previous clearing of vegetation which has caused significant alteration to the vegetation structure and species composition, soil surface disturbance along the North Eastern portion of the site due to alluvial diamond mining operations and linear trenches/canals associated with these mined areas.

Old slimes dams associated with historic mining activities are still present at the North Eastern part of the study area. However, the site has been dormant for more than 10 years.

21 Digit Surveyor General Code for Portion 1: | **C00700000000022600001**

Coordinates of the corners of the site:

Corner	Latitude (S)	Longitude (E)
A	-28.494531°	24.650505°
B	-28.494215°	24.651052°
C	-28.493947°	24.650955°
D	-28.493450°	24.650784°
E	-28.492855°	24.650738°
F	-28.492249°	24.650812°
G	-28.491678°	24.650947°

H	-28.491014°	24.651224°
I	-28.490374°	24.651922°
J	-28.489747°	24.653009°
K	-28.487329°	24.659132°
L	-28.492422°	24.661426°
M	-28.497527°	24.652748°

The coordinates of the centre of the site:

Centre of site	Latitude (S)	Longitude (E)
	-28.492473°	24.655838°

1.2 The Applicant

Applicant: Dorata (Pty) Ltd

Address: 2 Barnard Street
Potchefstroom
2531

1.3 The Environmental Assessment Practitioner ("EAP")

EAP: Turn 180 Environmental Consultants

Postal address: Suite 221
Private Bag X01
Brandhof
9324

Contact person: Louis De Villiers (EAP) /Morné van Wyk (Assistant EAP)

Tel: 072 967 7962/084 205 5769

E-mail: louis@turn180.co.za / morne@turn180.co.za

1.4 The project team:

Project Manager and EAP: : Louis De Villiers

Assistant EAP: : Morné van Wyk

1.5 Specialists:

Ecology, biodiversity and
wetland assessment: : Mr. Darius Van Rensburg

Heritage Specialist: : Dr. Lloyd Rossouw

Soil Specialist: : Darren Bouwer

Refer to **Annexure 1** attached hereto for the expertise of the EAP. The heritage and soil assessments will be included in the EIA reports.

2 Project description

2.1 Cultivation process

Approximately 68 ha of indigenous vegetation will be cleared for crop cultivation. A portion of the 68 ha to be cleared for crop production is within 100 m from a watercourse (refer to Figure 1 below and the layout map in **Annexure 2**).

The method of conventional centre-pivot irrigation will be used to irrigate the Lucerne of approximately 40 ha. This method makes use of equipment that pivots around a centre point, which is powered by a motor. The crops are watered by overhead sprinklers, which is fed with water from the pivot point. Lucerne is a crop which contains a high feeding value for numerous cattle species and as a result also requires large amounts of water. Lucerne can be harvested up to three times during the harvesting period. The 40 ha area will require 600 000 m³/a for optimal crop production which will be obtained through abstraction from the Vaal River.

Pecan Nut trees of approximately 28 ha, will also be planted. The irrigation method for Pecan Nut trees requires underground irrigation lines to be laid close to the tree's roots. This method employs a process of wetting the ground from beneath the surface, which keep the soils moist and optimizes the water intake of the trees through their roots. Pecan Nut trees require a large amount of water, approximately 500 l /day /per tree, for optimal production. Taking into consideration the 28 ha which is proposed and that each tree be planted 10 m away from each other, the total water requirements for this proposed Pecan Nut cultivation process comes to 504 000 m³/a.

3 Property description

The proposed development will take place on Portion 1 of the farm Harrisdale 226 ("Kilmorey"), Barkly West District, Northern Cape (refer to Figure 2 below and the locality map in **Annexure 2**). The site is zoned as agricultural land and is surrounded by numerous other cultivated areas. A farmhouse is also situated on the Kilmorey property, 1.3 km away from the study area in a North Easterly direction. There are no major roads close to the proposed site and the proposed site is located approximately 4.6 km North West, from the nearest town, which is Riverton. The site is also located approximately 13.5 km North East from Barkly West.

According to Mucina & Rutherford (2006) the area consists of Kimberley Thornveld (SVk 4). This vegetation type is currently listed as being of Least Concern (LC) under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). The vegetation type is not currently subjected to any pronounced transformation pressures. Riparian vegetation associated with the Vaal River consists of Highveld Alluvial Vegetation (Aza 5), also listed as being of Least Concern (LC) but does not form part of the proposed site (refer to Figure 3 below and the sensitivity map in **Annexure 2**). Furthermore, the natural vegetation type on the site has been transformed and consequently the conservation

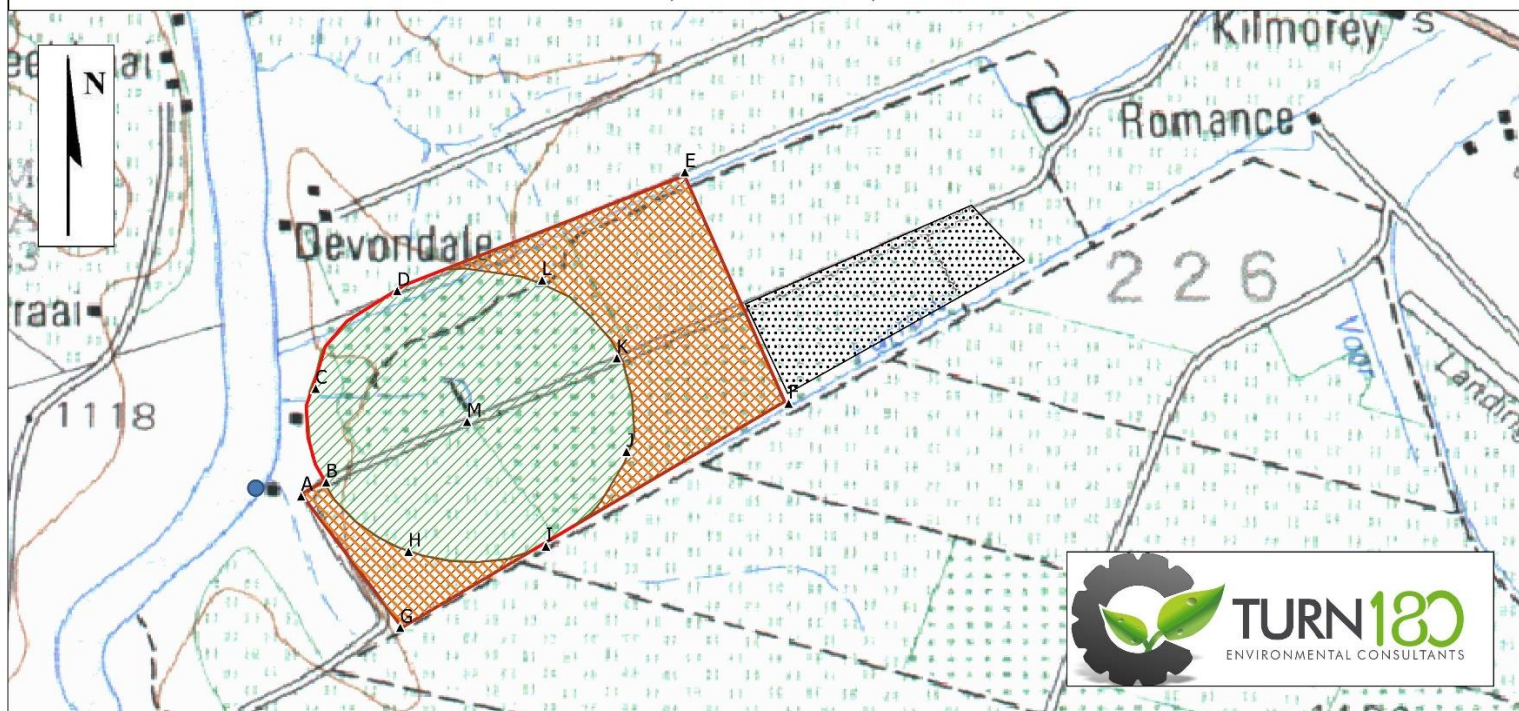
value is relatively low. Due to past agricultural and mining activities the study area is no longer in its original pristine conditions together with secondary vegetation which revegetated the abandoned area. As a result, the habitat and species diversity is consequently also very low.

An Index of Habitat Integrity ("**IHI**") was conducted along the Vaal River within the study area. The results of the IHI indicated that the Vaal River has an Instream IHI of category C/D: Moderately to Largely Modified and Riparian IHI of category D: Largely Modified. The Ecological Importance and Sensitivity ("**EI&S**") of the floodplains associated with the Vaal River has been rated as being Moderate Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers (refer to the Ecological and Wetland Assessment in **Annexure 4**). A soil analysis study will be conducted in order to obtain a plough certificate from the Northern Cape Department of Agriculture.

Kilmorey is approximately 116.15 ha in extent and is owned by Basfour 730 (Pty.) Ltd. It is bordered by Portion 13, 16 and 2 of the Farm Harrisdale 226. The impact significance has been determined and it is clear that the impacts before mitigation will vary from low to moderate with the impact on the Vaal River and increased infestation by exotics being the most notable as moderate impacts.

There are no surface water features located on the study area. However, Kilmorey encompasses a larger area which includes the study area as well as the Vaal River as the western boundary. A drainage line is also located West of the study area, just outside the study area boundary, which when filled with runoff will flow from South to North.

LAYOUT PLAN OF THE PROPOSED CLEARANCE OF INDIGENOUS VEGETATION FOR THE CROP PRODUCTION UNDER IRRIGATION ON PORTION 1 OF THE FARM HARRISDALE 226, BARKLEY WEST RD, NOTHERN CAPE.



APPLICANT:
DORATA (PTY) LTD
2 BARNARD STREET
POTCHEFSTROOM
2531

SITE INFORMATION
Coordinates:
Lat -28.492473° and Long 24.655838°
Site footprint: 68.5 ha

MAP INFORMATION:
Scale - 1:6 500
1:50 000 Topo Sheet - 2824BC
WGS84
Date - February 2019

Legend

- ▲ Coordinate Points
- ▨ Proposed land for Lucerne
- ▤ Old Slimes Dam
- Point of abstraction
- ▨ Proposed Pecan nut trees
- ▭ Study Area property boundary

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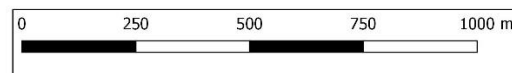
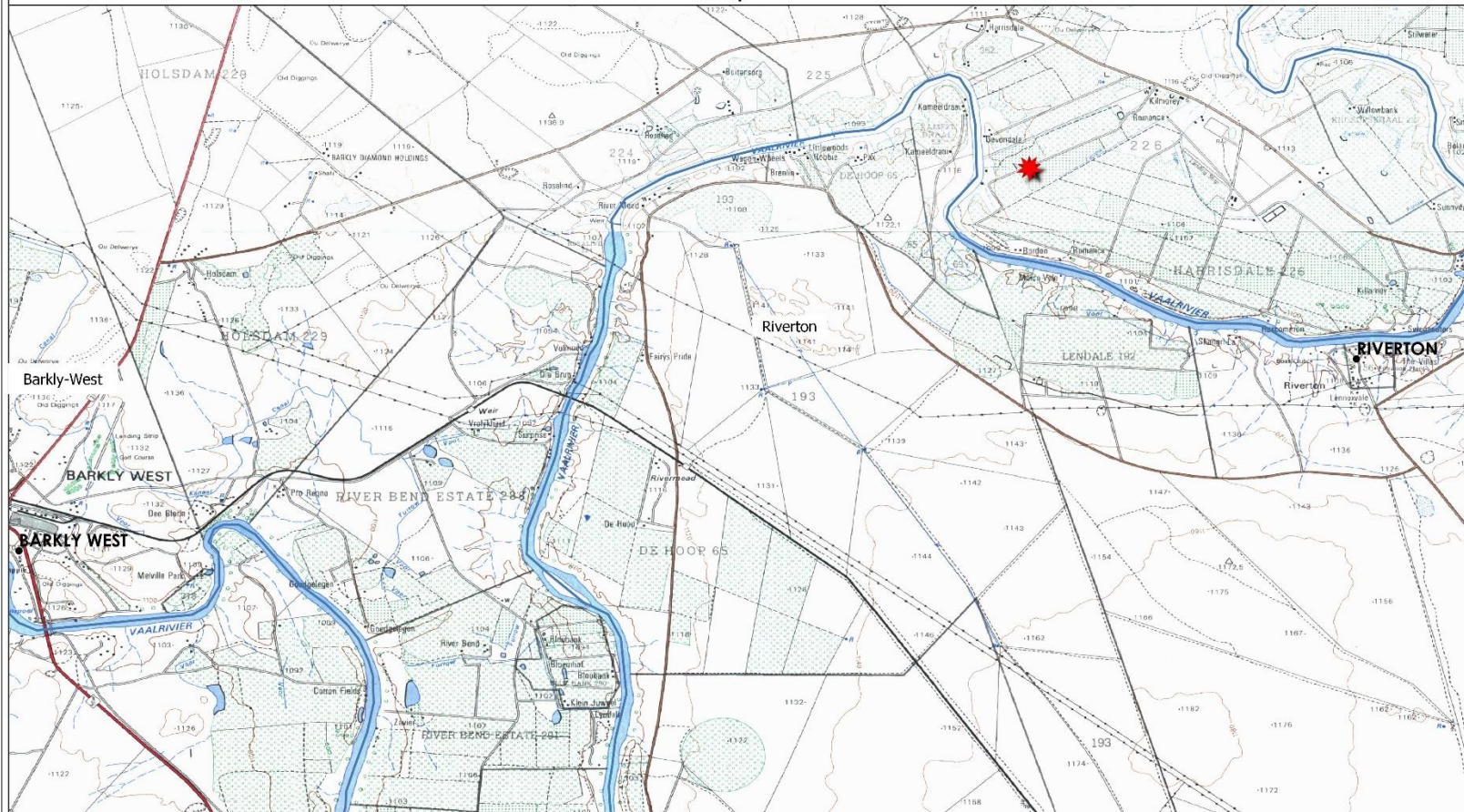


Figure 1: Layout map for the proposed project.

Map showing the locality of the proposed clearance of vegetation and cultivation of crops on Portion 1 of the farm Harrisdale 226 (Kilmorey), Barkly West District, Northern Cape.



APPLICANT:
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MAP INFORMATION:
Scale - 1:50 000
1:50 000 Topo Sheet - 2824BC
WGS84
Date - December 2018

SITE INFORMATION:
Coordinates:
Lat: -28.492473°S
Long: 24.655838°E



Legend
● Towns
— Vaal River
★ Proposed site



Figure 2: Locality Map for the proposed project.

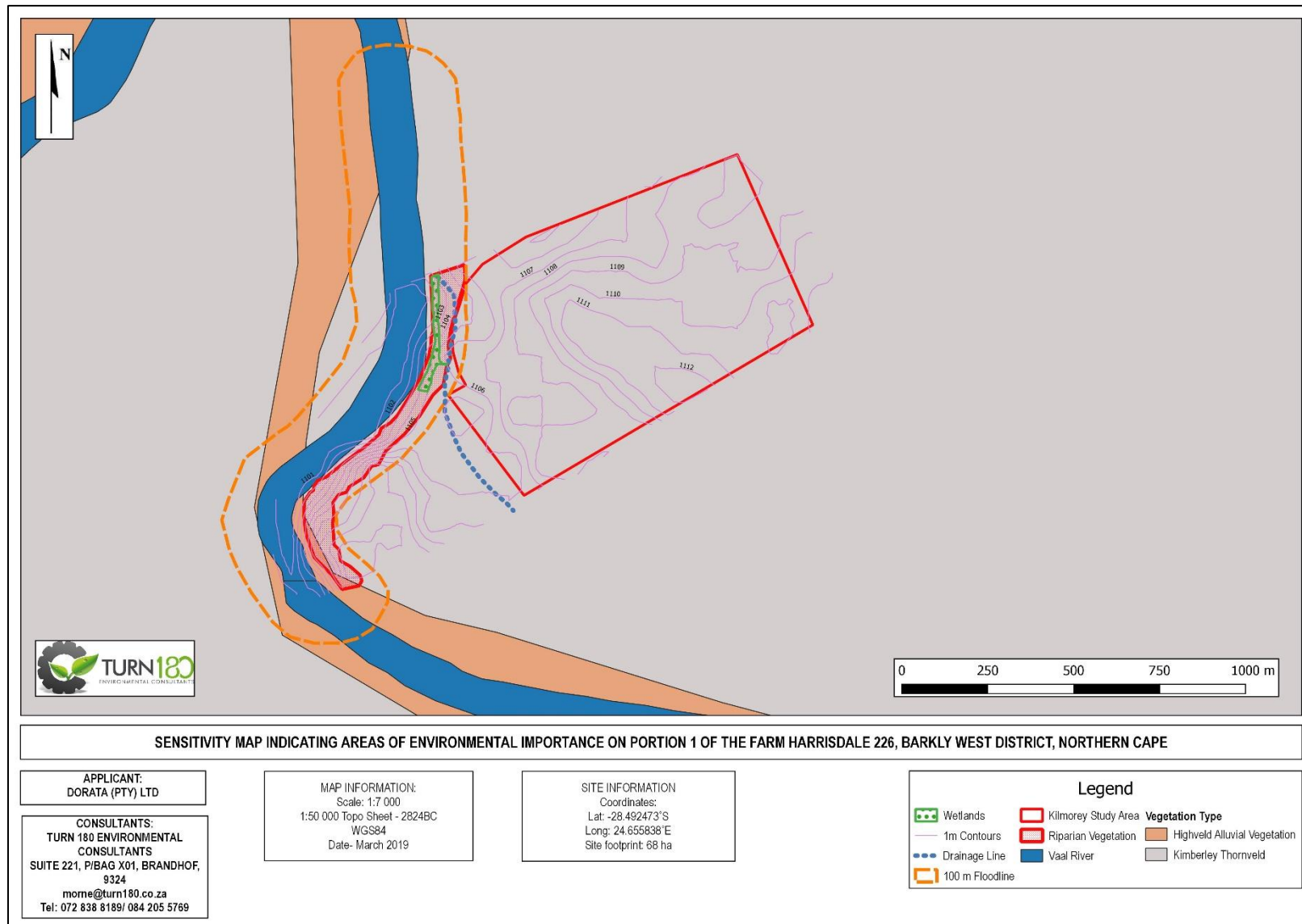


Figure 3: Sensitivity map for the proposed project.

3.1 Regional setting

Province: Northern Cape Province
District Municipality: Francis Baard District Municipality
Local Municipality: Dikgatlong Local Municipality

3.2 Zoning

The proposed site is zoned as agricultural land.

4 Project motivation

4.1 Legal requirement status

The aim of this section is to provide an overview of the legal framework and administrative requirements applicable to the licensing of the activity to ensure compliance with environmental requirements.

- **NEMA;**

A S&EIR process must be followed in terms of the 2014 EIA Regulations as amended in 2017 and the following activities are being applied for in terms of GN. R. 325 of the 2014 EIA Regulations as amended:

Number and date of the relevant notice	Activity No(s) in terms of the relevant notice	Description of each listed activity
GN. R. 325 7 April 2017	15	<i>"The clearance of an area of 20 ha or more of indigenous vegetation"</i>

- **NWA;**

An IWULA will be applied for in terms of the NWA for the following water uses:

Legislation	Water Use	Description of each Water Use
NWA	Section 21(a)	<i>"Taking of water from a water resource"</i>
NWA	Section 21(c)	<i>"Impeding or diverting the flow of water in a watercourse"</i>
NWA	Section 21(i)	<i>"Altering the bed, banks, course or characteristics of a watercourse"</i>

As previously mentioned, Section 21 (c) and (i) will not be an attempt to impede, divert flow and/or alter the watercourse in any way. The NWA only requires a Section 21 (c) and (i) to be completed when activities take place within 100 m of a watercourse and within 500 m a wetland area. The study area lies within 55 m of the Vaal River which contains a Wetland area.

- **NHRA;**

The site has not been given any formal protection by the SAHRA or the Northern Cape Provincial Heritage Authority under the NHRA. A Heritage Impact Assessment ("HIA") and Palaeontological Impact Assessment ("PIA") will be undertaken by a specialist to determine the historical value of the site and all findings will be communicated to SAHRA and the Northern Cape Provincial Heritage Authority during the EIA Phase of the project.

4.2 Need and desirability of the Project

Lucerne is one of the most important fodder crops grown as an alternative source of forage for animal production, which reduces the erosion from natural foraging. This project will lead to the production of good quality hay that will be sold commercially and that will contribute to the area's economy, as well as food security.

Pecan Nut prices over the years have exponentially increased from R 50 in 2004 to R 200 in 2016 per kilogram. 90% of all Pecan Nuts produced in South Africa are exported to foreign markets and fetch high prices as demand for them are still increasing. The planting of Pecan Nuts will therefore increase the national export and thus contribute to the economy. It takes around 8 years to make a financial return on the initial investment when starting from a new development.

It is planned that the planting of Lucerne will serve as a cash crop for approximately 8 years funding the development while the Pecan Nut trees reach maturity and start producing nuts and funding the development further. Considering the size of the planned Pecan Nut orchard, at least 10 or more job opportunities for local people will also be established through this project, as processing Pecan Nuts requires large amounts of labour during harvesting, processing and orchard maintenance.

4.3 Proposed Project

The applicant is a 60% black owned company who wants to clear an area of 68 ha of vegetation, the ploughing of soil and the planting and irrigation of crops in the form of Lucerne and Pecan Nut trees. Approximately 1 104 000 m³ water per year will be needed for irrigation. This water will be obtained from the Vaal River through abstraction.

The Project will benefit society in that:

- Numerous job opportunities for local people will be created.
- The food security of the area will be increased in the sense that cattle earmarked for meat production will have access to high quality feed.

- The economy of the area will be positively affected through increased agricultural production which will require machinery, vehicles, fertiliser, seed, etc. which will be obtained locally.

Negative aspects associated with the Project include the following:

- Lucerne and Pecan Nut trees have a high water demand which in this case is sourced from a natural resource.
- Over or unnecessary abstraction can lead to the Vaal River water levels decreasing and causing less water volumes downstream. This decrease in flow volume can aid the deposition of unwanted sediment banks. This negative aspect is, however, highly unlikely as the whole area then needs to abstract significantly more water to produce the above-mentioned impact.
- Runoff and seepage containing concentrations of fertilizers and pesticides can negatively impact the quality of the Vaal River and groundwater.

5 Alternatives

5.1 Location alternatives:

There is no feasible location alternative for this project that will be assessed due to the following reasons:

The area chosen for the proposed site is the only part of Kilmorey that can be used as no other land is available on the farm. Mining for alluvial diamonds on the property in the past left the land to the east damaged and not suitable for the cultivation of Lucerne which needs moist topsoil to grow effectively. The proposed site has been used in the past for pivot irrigation before mining took place. After mining ceased the study area was left to revegetate itself. The surrounding properties do not belong to the same landowner and are already used for cultivation. Thus, no other alternatives are available for this site due to limited area.

5.2 Design / Layout alternative:

The site has been cultivated in the past. This application simply seeks to continue (with EA) the agricultural activities on the same site before mining took place and left the study area abandoned. Certain aspects of the layout can be changed as the location of the pump in the Vaal River is not fixed. There is however a pump house located near the Vaal River which will be used. This building can be demolished and built on a new location near the Vaal River. This however is very impractical since it will cost time and money to rebuild the pump house and loss of riparian vegetation will take place to make space for the new building. The pivot point can also be moved but will also be impractical due to the study area being of limited size together with the considerable time and money it will take to implement this change.

5.3 Technological alternative:

As far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment. Pivot and sprinkler irrigation systems will be used to irrigate the Lucerne crops which require large areas to be feasible. The pivot and sprinkler system are the only way of effectively irrigating such a large area daily. The water will be abstracted from the Vaal River and directly fed to the pivot and the sprinklers as storing the large amounts of water required daily by Lucerne is not feasible at the proposed site. Dry land farming is not a feasible alternative, due to the area which does not receive sufficient rainfall to support Lucerne. Lucerne needs large amounts of water for optimal production which is around 1 200 mm annually per hectare.

The Pecan Nut trees will also use water directly abstracted from the Vaal river. The preferred method for irrigating Pecan Nut trees makes use of underground wetting processes where irrigation lines are situated underground near the trees to directly wet the area containing the tree roots. This is the most practical method of irrigation for Pecan Nut trees as it optimizes the amount of water taken up by the trees and ensures minimal loss of water through evaporation. Also, heavy-duty rakes, pesticide sprayers and tree shakers are usually used during orchard management and harvesting.

5.4 No Go alternative:

The "no-go" alternative will be considered throughout the assessment of the proposed project. If the project cannot be authorised, no Lucerne or Pecan Nuts will be produced, which will lead to no creation of new jobs as well as losing an opportunity to boost the economy in the agricultural sector.

6 Description of the receiving environment that might be affected and a description of environmental issues, potential impacts and cumulative effects

6.1 Geology and soil

Overview

The geology of the area consists of Andesitic lavas of the Allanridge Formation and fine-grained sediments of the Karoo Supergroup. The soil consists of deep sandy to loamy soil. The proposed site specifically has geology of sedimentary origin and red-yellow apedal, freely-drained soil with a depth of 450 mm – 750 mm (ENPAT, 2001; Mucina & Rutherford, 2006: 516).

Potential impacts	Preliminary significance	Mitigation
There will not be any impact on geology, as ploughing only loosens the upper few centimetres of soil.	Geology: No impact	Reduce soil loss through soil conservation works, leaving crop residues on

However, some soil might be lost due to erosion and wind.	Soil: Moderate	land and avoiding the use of infield transport and heavy machinery during wet conditions. Implement berms to catch soil which may erode from the cleared area during the start of the development and during successive years of cultivation and harvesting.
Cumulative impacts	Preliminary significance	Mitigation
<p>The clearance of vegetation for crop production may have a cumulative impact on the soil as large areas along the Vaal River are cleared for crop production.</p> <p>The upper part of the soil profile can either be enriched with salts or depleted of certain minerals needed for successful crop production during successive years of production.</p>	Low	<p>Reduce soil loss through soil conservation works, leaving crop residues on land and avoiding the use of infield transport and heavy machinery during wet conditions.</p> <p>Construct berms to collect soil eroding from the surface.</p> <p>Regular soil sampling should provide the necessary information to apply the correct fertilizers.</p>

6.2 Climate

Overview

The area is located in Rain Zone C9B and receives summer and autumn rainfall between 300 mm – 400 mm annually (Water Resource Council, 2005). The proposed site is also located in Evaporation Zone 9B with a mean annual evaporation between 2 000 – 2 200 mm per annum (Water Resource Council, 2005).

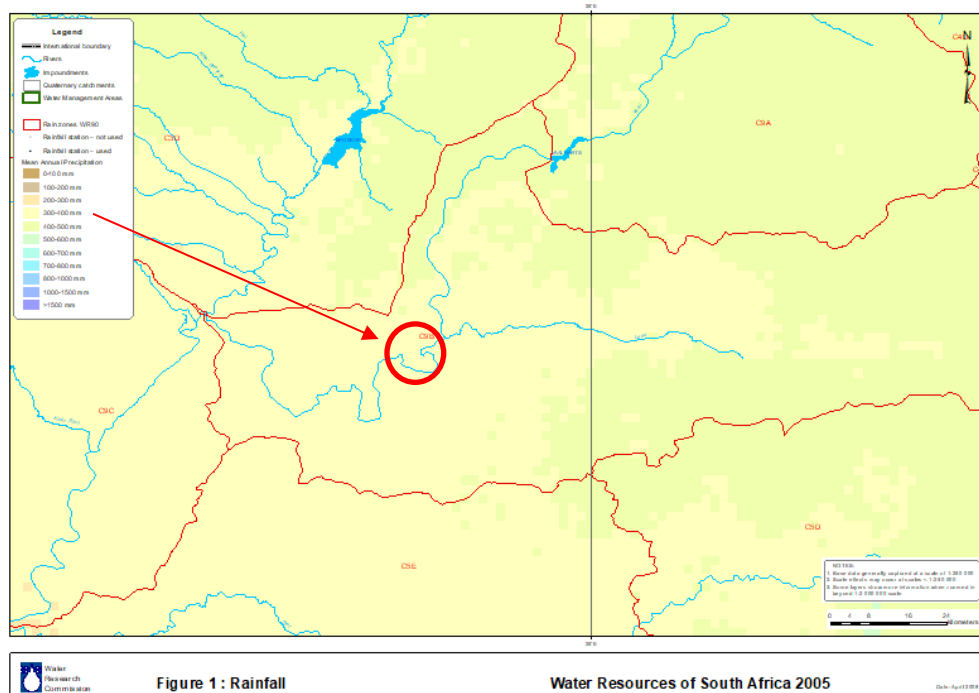
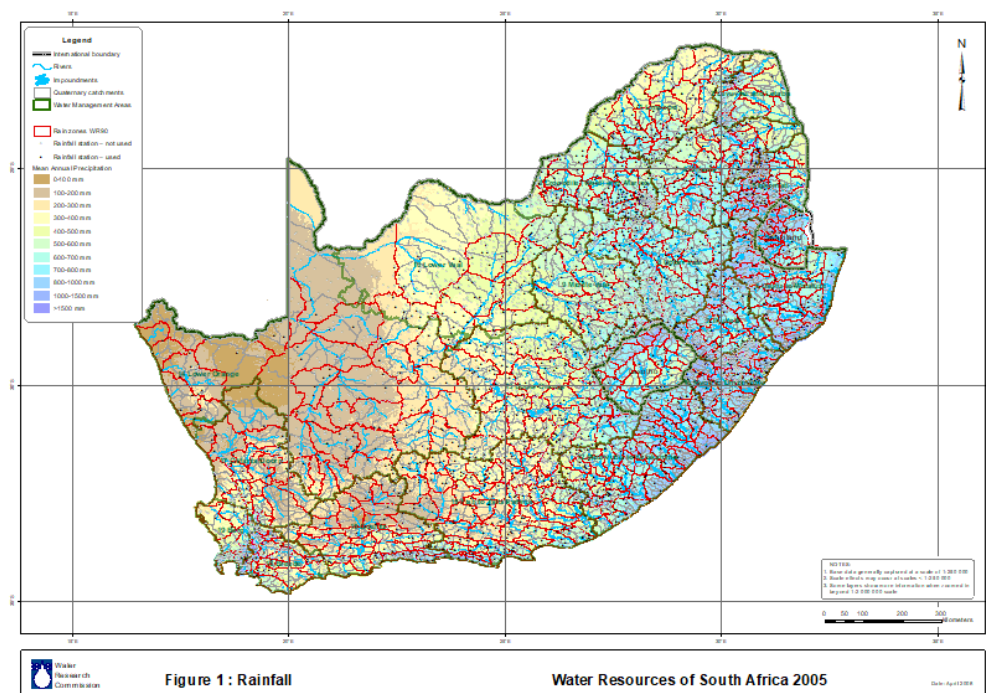


Figure 4: Map indicating the mean annual rainfall of the proposed site.

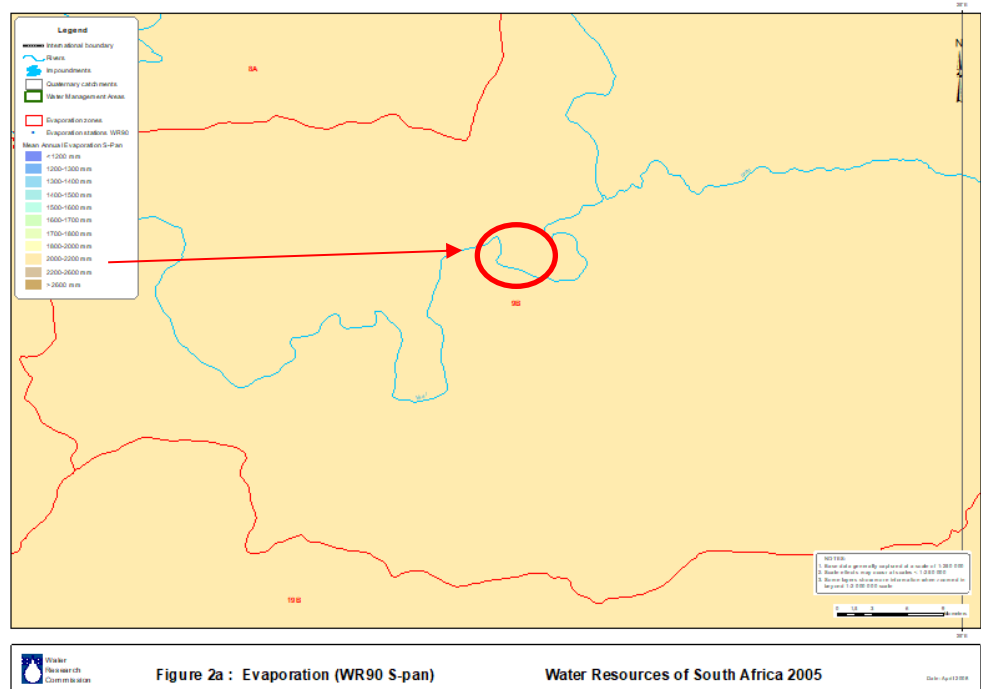
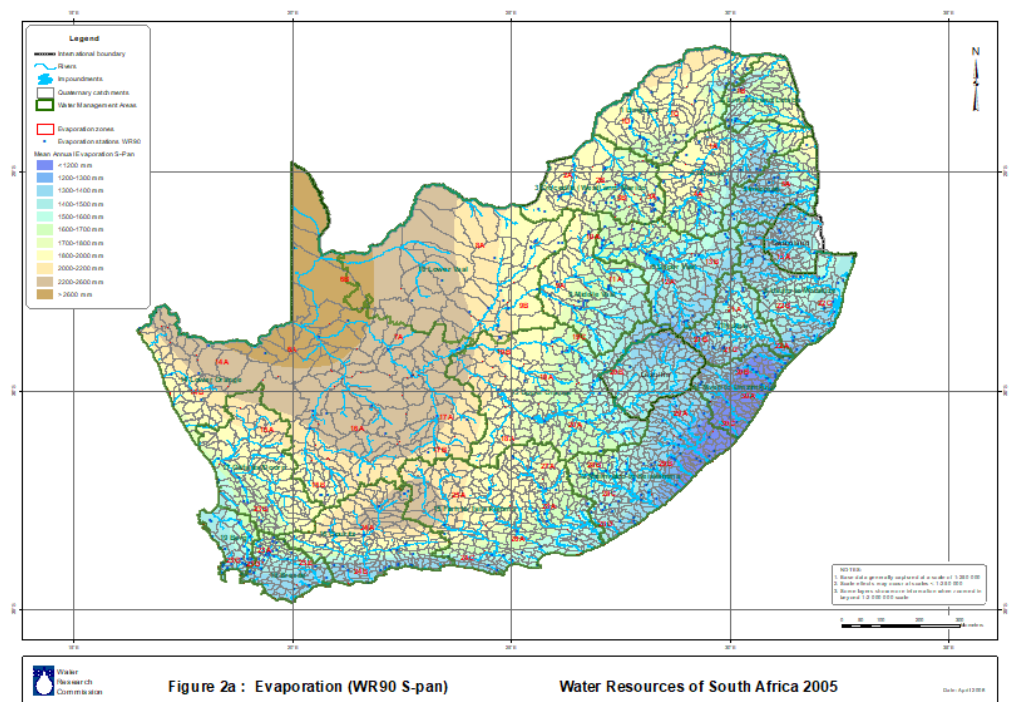


Figure 2: Map indicating the mean annual evaporation of the proposed site.

The mean monthly maximum and minimum temperatures for Kimberley are 37.5 °C and -4.1 °C for January and July respectively (Mucina & Rutherford, 2006: 516).

Potential impacts	Preliminary significance	Mitigation
The climate in the area will not be impacted on by the proposed project due to the nature and scale thereof.	Negligible	Limit the burning of crop residue as well as unnecessary use of machinery.
Cumulative impacts	Preliminary significance	
The project may have a cumulative impact due to the surrounding environment being extensively used for crop production. Crop production contributes to greenhouse gasses as emissions occur through the use of machinery, agricultural inputs (i.e. fertilisers) and burning of crop residue.	Low	

6.3 Air quality

Overview

The ambient air quality in the region is good due to the lack of heavy industrial complexes. However, the air quality in the area can be negatively impacted on by the areas cleared of vegetation for crop production. The risk of air pollution is especially high during the ploughing of soil and soil laying bare during very windy conditions.

Potential impacts	Preliminary significance	Mitigation
The air quality may be negatively impacted by the use of pesticides and fertilizers on the crops, as well as dust emissions due to working in the fields.	Low	Using more efficient fertilizer to increase nutrient efficiency for crops and reducing dust emissions by planting Pecan Nut trees once in its lifetime as well as planting Lucerne every 3 – 5 years.
Cumulative impacts	Preliminary significance	Best practices during general maintenance of the Lucerne field and

		Pecan Nut orchard can also keep air quality at acceptable levels.
<p>There might be a cumulative impact on air quality as a result of past and current operations in and around the study area. Also, the clearing of the additional area of vegetation which is not part of the study area.</p> <p>An old slime dam is also located on the property outside the study area.</p>	Low	<p>Implementing the areas that are not used for agricultural development as no-go areas and preserving the natural state of the environment.</p> <p>Also covering the slime dam with soil that is not easily eroded will prevent fine dust from entering the surrounding air.</p>

6.4 Groundwater

Overview

Since the area is so closely situated to the Vaal River, it is expected that the water level will be close to the surface approximately around 10 meters below ground level ("**mbgl**"). The actual aquifer might be deeper around 20 -30 mbgl and exists as either; (1) an intergranular aquifer consisting of consolidated sands and clays or (2) contact aquifer between sandstones and the prevailing igneous rocks (dyke or sill). Due to the proximity of the aquifer to the Vaal River it can be assumed that these two systems are reliant on each other. The quality of the groundwater is expected to be good to moderate as extensive agriculture takes place in the surrounding environment and is highly likely that nitrate rich fertilizer and pesticides have infiltrated the aquifer causing elevated values of total dissolved solids.

Potential impacts	Preliminary significance	Mitigation
<p>Groundwater may become contaminated as a result of the infiltration of pesticides and fertilizers into the ground.</p> <p>Spillage of hydrocarbons from machinery may also contaminate groundwater.</p> <p>Over or excessive irrigation can also elevate the ground water level closer to the surface through excess infiltration in a process called artificial recharge. This can also increase the contact time the water level has with nitrate enriched soils causing contamination of that aquifer.</p>	Low-Medium	<p>Monitor irrigation volumes as well as the soil to prevent overuse or excess nitrate and pesticides entering the aquifer.</p> <p>Machinery should be maintained to prevent leakage of hydrocarbons.</p> <p>No maintenance should be done on the site which may lead to contamination of groundwater.</p> <p>Any spills of hydrocarbons will be cleaned.</p> <p>Monitor irrigation volumes closely to avoid flooding a field.</p>
Cumulative impacts	Preliminary significance	
There might be a cumulative impact on groundwater as a result of past and current operations (cultivation in the area).	Low-Medium	

6.5 Surface water

Overview

There are no surface water features on the study area, but Kilmorey includes the Vaal River as well as being proceeded by wetlands and a single drainage line bordering the study area, flowing from South to North. The Vaal River is located within 55 m of the proposed site.

Potential impacts	Preliminary significance	Mitigation
<p>Surface water may become contaminated as a result of the run-off of pesticides and fertilizer.</p> <p>Ploughing the fields so close to the Vaal River may cause airborne dust from the fields to enter the Vaal River adding to the overall sedimentation load of the river.</p>	Low-Medium	<p>Implement stormwater management techniques to reduce run-off into the Vaal river.</p> <p>Use the best agricultural practices to decrease the generation of dust.</p>
Cumulative impacts	Preliminary significance	
There might be a cumulative impact on surface water as a result of past and current operations (cultivation in the area).	Low-Medium	

6.6 Land use

Overview

The study area has previously been used for agricultural activities. Mining took place to the North West of the study area marginally proceeding and ending on the border of the proposed site. The slimes dams are still present outside the study area which was also used for agricultural activities before mining took place. The current land use is classified as being vacant and only used for the grazing of cattle.

Potential impacts	Preliminary significance	Mitigation
The crop production on the proposed site will fit the land use as it will still be used for agriculture.	Negligible	
Cumulative impacts	Preliminary significance	
No impact	None	

6.7 Vegetation

Overview

According to Mucina & Rutherford (2006) the area consists of Kimberley Thornveld (SVk 4). This vegetation type is currently listed as being of Least Concern (LC) under the National List of

Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004) (Map 2). The vegetation type is not currently subjected to any pronounced transformation pressures. Riparian vegetation associated with the Vaal River consists of Highveld Alluvial Vegetation (Aza 5), also listed as being of Least Concern (LC) but does not form part of the proposed site.

The site consists mostly of natural vegetation though it is clear that a crop field including centre-pivot was present at some time. By looking at the current vegetation this must have been several years ago. Therefore, the vegetation on the site, although indigenous, must be of secondary establishment (refer to the Ecological and Wetland Assessment in **Annexure 4**).

Potential impacts	Preliminary significance	Mitigation
An area of 68 ha will need to be cleared, which will lead to loss of vegetation. However, the area falls within the Kimberley Thornveld vegetation type, which is Least Threatened. The site is also already disturbed due to previously being used for agricultural activities.	Low - Medium	No clearance of vegetation will occur beyond the footprint of the proposed site. It is also good practice to remove any alien vegetation which may establish itself.
Cumulative impacts	Preliminary significance	Rehabilitate the agricultural land after production has ceased and try to establish the natural vegetation.
The clearance of 68 ha of vegetation for the cultivation of Lucerne and Pecan Nut trees means that this vegetation will be lost until the agricultural activity stops and the vegetation is given time to re-establish itself. Due to the nature of the activities some plant species might not adapt and subsequently decrease in number from the surrounding area.	Low	

6.8 Animal life

Overview

Tracks and signs of mammals are present on the site but notably diminished from the natural condition. This is probably due to the largely transformed vegetation type on the site and its

isolation from larger areas of natural vegetation by surrounding crop fields. Extensive centre-pivot irrigation surrounds the site and has resulted in the clearance of natural vegetation. Mammal species which are rare and endangered are often habitat specific and sensitive to habitat change. It is therefore considered unlikely that such species would occur on the site.

Numerous small burrows occur on the site and is most likely those of small rodents. These burrows are most likely those of the Multimammate Mouse (*Mastomys coucha*) and the Striped Mouse (*Rhabdomys pumilio*). According to Avenant (2000) where extensive disturbance of grassland occur these species dominate. It has also been shown that these rodent species can be used as indicators of grassland degradation (Avenant & Cavallini 2007, MacFadyen *et al.* 2012). In light of the transformed and pioneer condition of the grassland on the site this is considered the most likely occupants of the small burrows (refer to the Ecological and Wetland Assessment in **Annexure 4**).

Potential impacts	Preliminary significance rating	Mitigation
The impact on animal life will be low due to the extensive disturbance to the grassland and the abundance of rodent species as well as the site being isolated from large natural vegetated areas. There is also no trace of rare or endangered species as they prefer specialized habitats	Low	Rehabilitation afterwards may restore disturbed habitats.
Cumulative impacts	Preliminary significance	
No impact	None	

6.9 Cultural Heritage

Overview

The proposed site is disturbed as a result of previous agricultural activities on the site. It is possible that certain historic items may be found around the Vaal River and in its floodplain as it was always a source of water in the past and the soil profile is at least 1 m thick in this area, potentially preserving historic items. There are no buildings older than 60 years or any graves present on the proposed site. It is uncertain if there are any graves on the rest of the property. A HIA and PIA will be included as part of the EIA process.

Potential impacts	Preliminary significance rating	Mitigation

It is not foreseen that there will be any impact on cultural heritage. Due to the degraded state of the proposed site, there are no buildings and/or sites with heritage value present. A HIA and PIA will be included as part of the EIA process to determine if there are any buildings and/or sites of cultural heritage or any paleontological remains on the rest of the property.	Low	If any signs of culturally or historically significant elements (including archaeological or paleontological elements) are discovered during the lifetime of the activities, all activities on and close to the discovery should discontinue. An archaeologist and palaeontologist should be notified.
Cumulative impacts	Preliminary significance	
None	None	SAHRA should be notified. The activities may continue if the contractor received written consent from SAHRA and / or the specialists (palaeontologist / archaeologist).

6.10 Noise

Overview

The surrounding area consists of cultivation which may contribute to noise in the area. However, due to the activities associated with the area being mainly agricultural, the noise pollution remains low.

Potential impacts	Preliminary significance rating	Mitigation
The potential noise that may result from ploughing and agricultural machinery is the same as in the surrounding area, seeing as the surrounding area is also cultivated	Low	Work will only be done during normal daylight hours.

land. Also, noise from agricultural activities are not very significant.		
Cumulative impacts	Preliminary significance	
There might be a cumulative impact on noise as a result of past and current operations (cultivation in the area).	Low	

6.11 Aesthetics

Overview

The area surrounding the site is used for cultivation and is therefore significantly degraded and has low visual significance. The site itself was also used for agricultural activities and alluvial diamond mining in the past and this also had a negative impact on the aesthetics of the area.

Potential impacts	Preliminary significance	Mitigation
Due to the site and the surrounding area already being degraded, the proposed project will not have a significant negative impact on the aesthetics.	Low	In an attempt to increase the aesthetic value around the Vaal River trees can be planted and alien vegetation removed which will also aid in dust suppression.
Cumulative impacts	Preliminary significance	
No impact	None	

6.12 Demographics and Regional socio-economic structure

Overview

The nearest town to the site is Riverton, followed by Barkly West. Barkly West has a population of 8258 (No statistics on Riverton could be found). Of this, 63.3 % is considered to be working age (15-64), while 31 % of the population is young (0-14) and 5.6 % is elderly (65+). The population consists of 41.9 % Black Africans, followed by 47.2 % Coloureds, 9.0 % Whites, 0.5 % Indian/Asian and 1.3 % Other (STATS SA, 2018).

Potential impacts	Preliminary significance	Mitigation
The cultivation of the land may create employment opportunities. The need for specialised equipment and skills will arise during the cultivation of crops.	Positive	The employment opportunities that will be created can be filled from sourcing people from the local community and surrounding areas.
Cumulative impacts	Preliminary significance	Using local business to support the crop development in terms of repairs, training employees, transportation of products and selling to local markets.
Positive cumulative impact	Positive	

7 Public participation during the scoping phase

7.1 Consultation process

Project initiation

A PPP under the EIA Regulations was undertaken as part of the Scoping Phase, which included the following:

- Placing site notices at the entrance to the site and on the proposed site;
- Placing adverts in the Diamond Field Advertiser ("**DFA**") and Noord Kaap newspaper;
- a Notification and Background Information Document ("**BID**") regarding the proposed project was sent to all Identified Interested and Affected Parties ("**I&APs**"). This includes the adjacent landowners and relevant authorities (refer to **Annexure 3**).

A time period of 30 days was allowed for the public to register and / or send their issues and concerns regarding the project to Turn 180 Environmental Consultants Environmental.

Interested and Affected Parties / Stakeholders

Adjacent landowners and relevant stakeholders were notified of the Project via written notifications and a BID. The main purpose of this was to inform the potential I&APs of the project and obtain insight into any related issues they may have.

A comments and response register will be made and updated to include all comments received from I&APs. This register will also record the responses from the consultants and how comments are addressed.

Authorities

The following departments and / or organs of state were consulted during the PPP:

- Department of Agriculture, Land Reform and Rural Development;
- SAHRA;
- Northern Cape Provincial Heritage Authority;
- Department of Water and Sanitation ("**DWS**");
- Department of Environment and Nature Conservation ("**DENC**")
- Dikgatlong Local Municipality (Municipal Manager and Ward Councillor);
- Francis Baard District Municipality.

7.2 Register of I&APs / Stakeholders / Authorities contacted during the consultation process

Contact Person	Organisation	Contact detail	Manner of notification	Comments & Response
Authorities & Stakeholders				
Ms. Z.M. Bogatsu (Municipal Manager)	Frances Baard District Municipality	Private Bag X6088 Kimberley 8300 51 Drakensberg Ave Carters Glen Kimberley Contact: Fatima Ruiters (Personal Assistant) 053 838 0998 (Tell) fatima.ruiters@fbdm.co.za (E-mail)	BID sent via Email on 28/08/2018. Draft Scoping Report delivered by hand on 18/03/2019.	No comments received.
Mr. Kgotso Moeketsi (Acting Municipal Manager)	Dikgatlong Local Municipality	33 Cambell Street Barkly-West 8375 053 531 6500 (Tel)	BID sent via Registered post on 29/08/18. Draft Scoping Report delivered via courier on 18/03/2019.	No comments received.
Municipal Ward Councillor: Ward 2	Dikgatlong Local Municipality	33 Cambell Street Barkly-West 8375 053 531 6500 (Tel)	BID sent via Registered post on 29/08/18. Draft Scoping Report delivered via courier on 18/03/2019.	No comments received.

Contact Person	Organisation	Contact detail	Manner of notification	Comments & Response
Mr. W. Mothibi (HOD – Agricultural and Rural Development) OR Harm Voster	Department of Agriculture, Land reform and Rural Development (Northern Cape)	053 838 9100 (Tel) Private Bag X5018 Kimberley 8300 162 George Street Kimberlite Building 083 233 7730 (Cell)	BID sent via Registered post on 29/08/18. Draft Scoping Report delivered by hand on 18/03/2019.	Comment: The Department of Agriculture, Land reform and Rural Development requested that an application should be made for a plough certificate and that a soil analysis should be done. Response: The plough certificate and the soil analysis will be included in the EIA report.
Ms Elizabeth Botes (HOD- Environment and Nature Conservation)	Department of Environment and Nature Conservation (Northern Cape)	Private Bag X6010 Kimberley 8301 90 Long Street Kimberley 8300 053 807 7300 (Tell) 053 807 7328 (Fax)	BID sent via Registered post on 29/08/18. Draft Scoping Report delivered by hand on 18/03/2019.	No comments received.
Mr. A. Abrahams (Chief director)	Department of Water affairs – Water Management Area 10	053 830 8803 (Tel) 0082 883 6741 (Cell) 0053 831 4534 (Fax) Private Bag X6101 Kimberley 8300 AbrahamsA@dwa.gov.za (E-mail)	BID sent via Email on 28/08/2018. Draft Scoping Report delivered by hand on 18/03/2019.	No comments received.
Me. Natasha Higgitt (Heritage Officer)	South-African Heritage Resource Agency	021 462 4502 (Tel) P.O. Box 4637 Cape Town 8000	BID uploaded on SAHRIS on 28/08/2018. Draft Scoping Report uploaded on	Comment: SAHRA commented that a Heritage Impact Assessment must be done as part of the EIA process. They also requested that the Draft and Final Scoping Report be submitted to them. Comments attached in Annexure 3. Response:

Contact Person	Organisation	Contact detail	Manner of notification	Comments & Response
			SAHRIS on 18/03/2019.	A Heritage Impact Assessment will be included in the EIA report. The Draft and Final Scoping Report was uploaded on SAHRIS.
Ms. Pauline Williams (MEC)	Northern Cape Provincial Heritage Authority	1 Monridge Office Park c/o Kekewich Drive & Memorial Road Kimberley 8300 079 036 9695 (Cell) rtimothy@nbkb.org.za (Email)	BID sent via Email on 28/08/2018. Draft Scoping Report delivered by hand on 18/03/2019.	No comments received.
Identified Interested and Affected Parties				
Landowner: Basfour 730 (Pty.) Ltd Marius De Villiers	Harrisdale 1/226	082 450 1485 (Cell) divprok@gmail.com (Email)	BID sent via Email on 30/08/2018	No comments received.
Deon Celliers	Harrisdale 16/226	deonc@nugen.co.za (Email) 083 446 2084 (Cell)	BID sent via Email on 28/08/2018	No comments received.
Louis De Kock	Harrisdale 13/226 Harrisdale 2/226	082 820 3393 (Cell) PO Box 46 Barkly West 8375	BID sent via Registered post on 29/08/18. Registered as I&AP on 25 September 2018. Draft Scoping Report sent via registered post on 18/03/2019.	Comment: He requested to be kept informed throughout the project. Response: Mr. De Kock will receive all future reports.
Marius Malherbe	Kameeldraai	083 2612 952 (Cell) marius@malupork.com (Email)	BID sent via Email on 29/08/2018	No comments received.

8 Plan of study for the Environmental Impact Assessment

8.1 Assessment Methodology

The main objective of the EIA process will be to assess and quantify the potential impacts that were identified by the project team, specialists and I&APs during the Scoping study.

The concept of "significance" is at the core of impact identification, evaluation and decision-making during the EIA process and can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood), while impact significance is the value placed on the change by different affected parties (i.e. level of acceptability) [DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5].

The significance is rated from Low to High, as indicated in the table below. The table includes an explanation of the impact magnitude and a guide that reflects the extent of the proposed mitigation measures deemed necessary.

Significance	Low	Low-Medium	Medium	Medium-High	High
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to I&AP.	Impact is real and substantial in relation to other impacts. Pose a risk to the I&AP. Unacceptable.	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk,	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Significance	Low	Low-Medium	Medium	Medium-High	High
		potential increase in risk. Where possible improve	where possible.		

The assessment criteria as mentioned above can be described as follow:

The **nature of impact** is a broad indication of what is being affected and how.

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects will impact on the biophysical and socio-economic environment.

Type of criteria	8.2 Rating				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant / Harmful	Great / Very harmful	Disastrous / Extremely harmful
Social / Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable / Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate / High potential to mitigate impacts to level of insignificance / Easily reversible	Low cost to mitigate	Substantial cost to mitigate / Potential to mitigate impacts / Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate / Little or no mechanism to mitigate impact / Irreversible

Type of criteria	8.2 Rating				
	1	2	3	4	5
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

Extent refers to the spatial influence of an impact. It will be: a) limited to the site and its immediate surroundings; b) extending to the surrounding local area, c) regional (will have an impact on the region) d) national (will have an impact on a national scale); or e) or international (impact across international borders).

Rating	Description
1: Low	Surrounding area
2: Low-Medium	Regional
3: Medium	National
4: Medium-High	International
5: High	Surrounding area

Frequency refers to how often the specific activity, related to the event, aspect or impact, is undertaken.

Rating	Description
1: Low	Once a year or once / more during operation / Life of Mine
2: Low-Medium	Once / more in 6 Months
3: Medium	Once / more a Month
4: Medium-High	Once / more a Week
5: High	Daily

Probability considers the likelihood of an impact/incident occurring over time.

Rating	Description
1: Low	Almost never / almost impossible

2: Low-Medium	Very seldom / highly unlikely
3: Medium	Infrequent / unlikely / seldom
4: Medium-High	Often / regularly / likely / possible
5: High	Daily / highly likely / definitely

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention, e.g. remedial action, takes place.

Rating	Description
1: Low	One month
2: Low-Medium	Between 1 and 3 months (Quarter)
3: Medium	3 months to 1 year
4: Medium-High	1 to 10 years
5: High	More than 10 years

Should any fatal flaws be identified during the EIA process, which will be indicated by a “high” significance rating, the activity relating to the potential impact will be assessed as a “no-go” alternative (i.e. be excluded from the project) if the impact cannot be managed and / or mitigated to acceptable levels.

8.2. EIA Process

8.2.1 Tasks anticipated for the EIA process

The list below is a summary of the tasks that will be undertaken as part of the EIA process and the manner in which they will be undertaken.

1. Conduct a Phase 1 Heritage Impact Assessment (“**HIA**”) and Paleontological Impact Assessment (“**PIA**”);
2. Conduct a soil analysis study;
3. Assess the impacts identified in the scoping phase of the project.

8.2.2 Consultation and public participation process

The PPP to be followed during the EIA process will include the following:

- continuous consultation with registered I&APs and the relevant Authorities;
- public meetings throughout the project for all registered I&APs if requested;

- updating of the I&AP database throughout the consultation process in order to keep record of all I&APs contacted during the process;
- send a copy of the EIA Report and Environmental Management Programme report to all registered I&AP and authorities for review and comment;
- compilation of a Comments & Response Report, that will include all comments received during the process (including comments received on any draft Reports) and the response taken by the EAP to address these comments where possible.

9 References

- **Van Rensburg, D.** 2018. *Report on the ecological and wetland assessment for the proposed establishment of irrigated croplands adjacent to the Vaal River near the town of Riverton, Northern Cape Province*. DPR Ecologists and Environmental Services
- **DEAT.** 2001. ENPAT, Department of Environmental Affairs and Tourism, Pretoria.
- **Mucina, L. & Rutherford, M.C. (eds)** 2006. *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- **Statistics South Africa (STATS SA).** 2018. Barkly West. Available at: http://www.statssa.gov.za/?page_id=4286&id=7055. [Date of access: 13/08/2018].
- **Water Resource Council,** 2005