

DRAFT ENVIRONMENTAL IMPACT REPORT

**Proposed cultivation of 135 ha virgin soil for the
establishment of 14 Seed Potato Farming Pivots and
associated water pipelines on the Remaining Extent of
the Farm Reliance No. 347 near Griekwastad, Northern
Cape Province**

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EXECUTIVE SUMMARY

The company Secundis Beleggings (Pty) Ltd. is proposing to commence with the process of procuring the Remaining Extent of the Farm Reliance No. 347 near the town of Griekwastad in the Northern Cape Province (135ha). The reason for the intended procurement is for establishing fourteen (14) seed potato farming pivots on the farm of natural previously uncultivated land.

It has to be noted that the seed potato pivot preparation and planting/development phase will take approximately 8 years to be complete and will continue to follow an 8-year rotation cycle. In other words, not all pivots will be planted simultaneously. After each season, each pivot will be rehabilitated using buffalo grass and will remain dormant/inactive for a period of 7 years, before planting will again commence on the pivot. This cycle will continue.

Eco-Con Environmental (Pty) Ltd. was appointed by Secundis Beleggings (Pty) Ltd. as the independent Environmental Assessment Practitioner (EAP) to conduct a full Scoping & EIA process for the proposed project. Eco-Con Environmental was established in May 2017. Although the formal establishment of the company took place in 2017, it is backed by more than 15 years of collective professional service and experience in the environmental field. The qualifications, expertise and experience of our professional team form the backbone of the company's continued success.

NEMA LISTED ACTIVITIES TRIGGERED BY THE PROPOSED PROJECT

The development activities in the National Environmental Management Act (Act 107 of 1998): Environmental Impact Assessment Regulations, 2017 (Government Notices R327, R325 and R324 in Government Gazette No. 38282 of April 2017 which are triggered by the proposed project are listed in the table below:

Regulation	Activity	Description of trigger activity in proposed project
GN. R. 325 Listing Notice 2	Activity 13 The physical alteration of virgin soil to agriculture, or afforestation for the purposes of commercial tree, timber or wood production of 100 hectares or more.	Cultivation and establishment of 14 seed potato pivots of approximately 135 ha of natural vegetation.
GN. R. 325 Listing Notice 2	Activity 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.	Cultivation and establishment of 14 seed potato pivots of approximately 135 ha of natural vegetation.

PROJECT LOCATION

The proposed project area is approximately 219 ha in surface size and is situated on the Remaining Extent of the Farm Reliance No. 347 (SG 21 Digit Code: C0310000000034700000). The proposed water pipeline will also be located on the above property and will not traverse any other portions or farms. The farm is located approximately 11km North-West of the town of Griekwastad. The property falls inside the Siyancuma local Municipality which, in turn, forms part of the greater Pixley Ka Seme District Municipality. Access to the proposed project area is obtained by way of the R 325 provincial road and a subsequent dirt road.

NEEDS AND DESIRABILITY OF THE PROJECT

Various key factors must be taken into consideration as motivation/incentive for the potential benefits involved with the proposed project. The Remaining Extent of the Farm Reliance No. 347 is currently of little economic value due to low grazing capacity for livestock purposes. Should the portion not be developed and efficiently utilised, the economic value will stay low. The development of seed potatoes on the farm will significantly increase the agricultural potential of the property, which will in turn increase the economic value. Construction and operational phase job creation (local employment) and sustainable capacity building (skills, experience and resources development) of this project will aid in immediate and continuous local community upliftment and poverty alleviation and are therefore regarded as significant socio-economic benefits associated with the proposed project to motivate the need and desirability. The outcomes of this project are also in line with the requirements and objectives of the National Development Plan; Northern Cape Provincial Spatial Development Framework; Northern Cape Provincial Growth and Development Strategy as well as the Siyancuma local Municipality and Pixley Ka Seme District Municipality Integrated Development Plans.

ALTERNATIVES CONSIDERED

Site / Property Alternatives

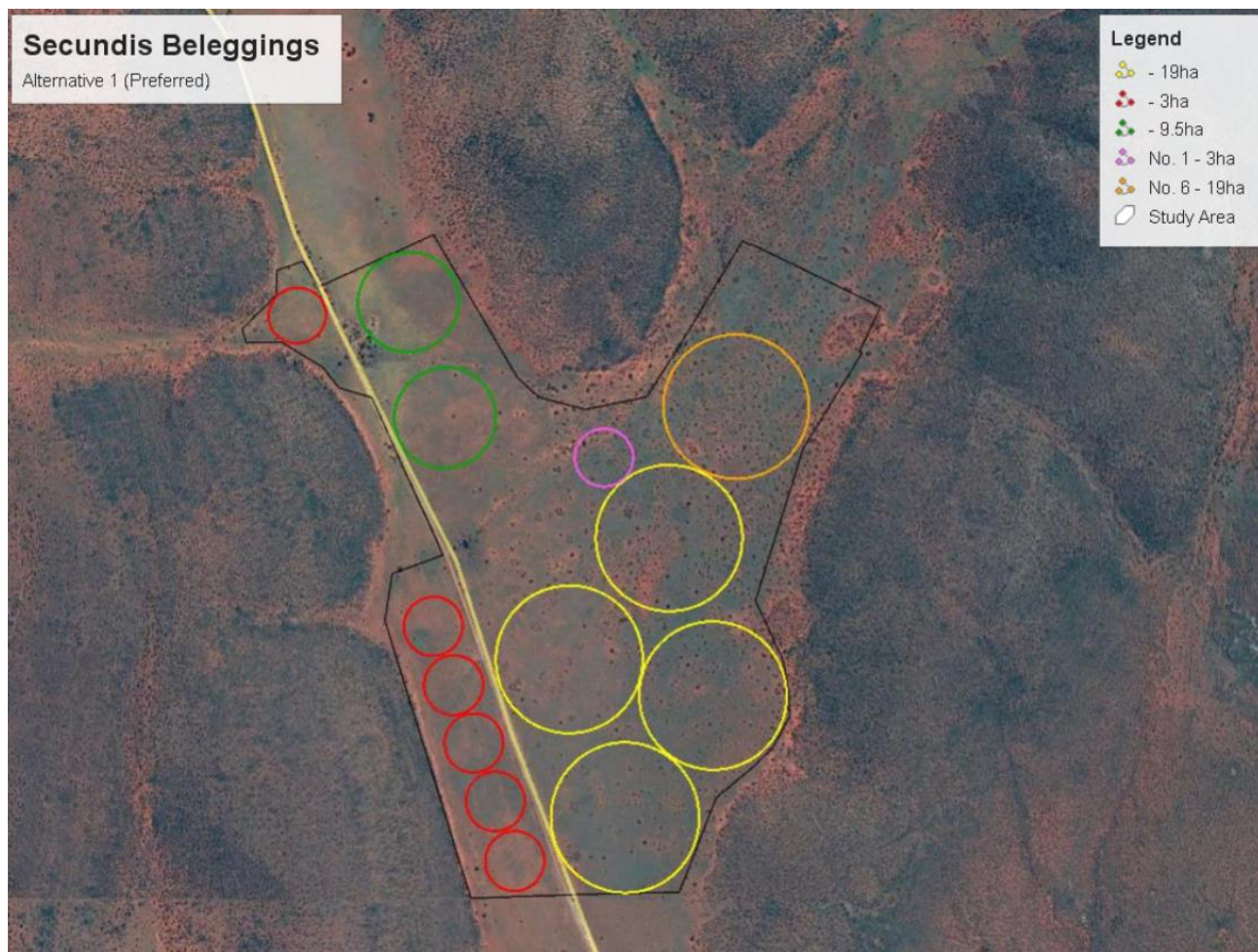
An alternative viable site location was not identified and evaluated for the project. The specific proposed location for said project is preferred as it is the only viable portion of land available in that vicinity which is up for procurement. The landowner and the applicant is the same person / company and therefore no Procurements arrangements had to be made. The portion is also situated directly adjacent to the homestead of the intending developer/project applicant which is on the farm portion from where water will be obtained for irrigation through extraction from boreholes. This will render the project viable from an economic and logistic perspective.

Layout Alternatives

Two layout alternatives are however considered on the proposed project footprint and are summarised below:

Layout Alternative 1 (Preferred Alternative)

The preferred layout alternative includes the development of fourteen (14) seed potato pivots which will constitute 7 x approximate 3 ha cultivated pivot lands; 2 x approximate 9.5 ha cultivated pivot lands and 5 x approximate 19 ha cultivated pivot lands. This results in a total footprint area of approximately 135 ha in size. Six (6) of the 3 ha pivots are located towards the Eastern portion of the study area and is located east of the gravel road. The remaining pivots as per above description will all be located West of the gravel road.

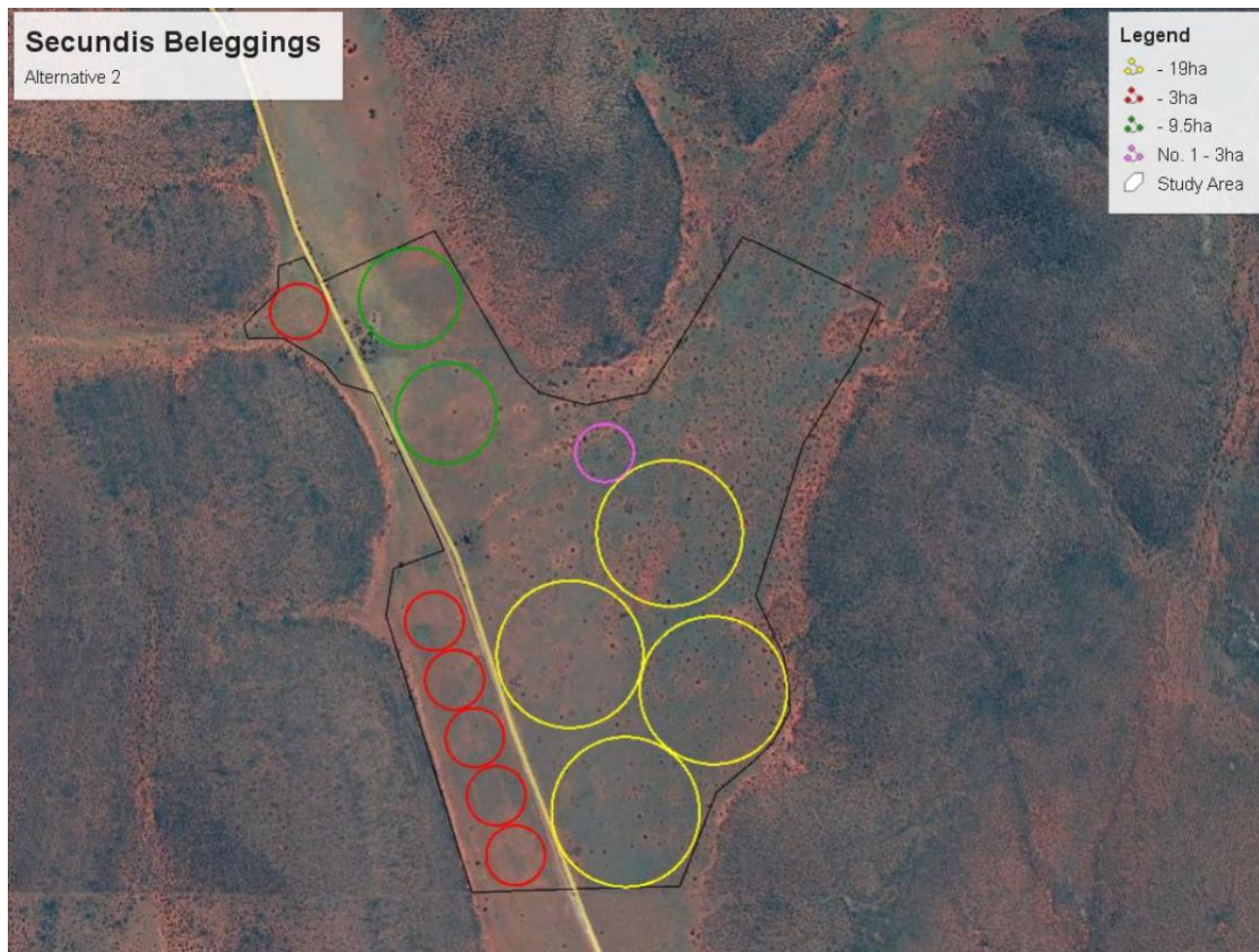


Secundis Beleggings Alternative 1 (Preferred Alternative)

Layout Alternative 2

Layout Alternative two includes the development of thirteen (13) seed potato pivots which will constitute 7 x approximate 3 ha cultivated pivot lands; 2 x approximate 9.5 ha cultivated pivot lands and 4 x approximate 19 ha cultivated pivot lands. This results in a total footprint area of approximately 116 ha in size. Six (6) of the 3 ha pivots are located towards the Eastern portion of the study area and is located east of the gravel road. The remaining pivots as per above description will all be located West of the gravel road. This alternative is the

same as Alternative 1 (preferred) except for the exclusion of 1 x approximate 19 ha cultivated pivot land situated in the north-eastern corner of the assessment area.



Secundis Beleggings Alternative 2

PUBLIC PARTICIPATION PROCESS

A continual and comprehensive Public Participation Process (PPP) was undertaken throughout the entire Scoping & EIA process with all stakeholders and Interested and Affected Parties (I & AP's), including the relevant organs of state and competent authority (Northern Cape Department of Environment and Nature Conservation) as identified during the Scoping Phase. The PPP was conducted in accordance with the requirements of Regulation 41 of the EIA Regulations, 2017 and the designated Public Participation Officer will ensure that the PPP is facilitated in a manner which ensures reasonable opportunity for all stakeholders and registered I & AP's to comment and provide input on the proposed project.

A summary of comment received during the scoping phase and Impact Assessment phase of the project, is listed under Table 15 and 16.

ENVIRONMENTAL IMPACT ASSESSMENT

Planning, Design and Construction Phase

PLANNING, DESIGN AND CONSTRUCTION PHASE					
Potential Flora Impacts:					
Nature of impact: Direct impact on Flora as a result of the transformation of terrestrial vegetation on the assessment area associated with the Olifantshoek Plains Thornveld vegetation type (SVk 13).			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Direct impact on Flora as a result of the destruction/damage to Red Data Listed, nationally or provincially protected species individuals associated with the Olifantshoek Plains Thornveld vegetation type (SVk 13)			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium-high (MH)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Direct impact on Flora as a result of alien invasive species establishment			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Avifauna Impacts:					
Nature of impact: Direct impact on other avifaunal species as a result of vegetation clearance transforming the breeding habitat			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium-high (MH)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Direct impact on other avifaunal species as a result of vegetation clearance transforming the foraging area			Activity: Proposed development of seed potato pivots		

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Fauna Impacts:					
Nature of impact: Direct impact on other faunal species as a result of vegetation clearance transforming the breeding habitat			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium-high (MH)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Direct impact on other faunal species as a result of vegetation clearance transforming the foraging area			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Dust Impacts:					
Nature of impact: Dust nuisance generated during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Noise Impacts:					
Nature of impact: Noise nuisance generated during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Cultural and Heritage Impacts:					
Nature of impact: Damage and destruction of vertebrate fossils during excavation activities.			Activity: Proposed development of seed potato pivots		
	Preferred Layout Alternative		Layout Alternative 2		

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:					
Nature of impact: Surface and Groundwater Contamination during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Impeding and contamination of the surface water catchment and drainage area towards the south			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Waste Management Impacts:					
Nature of impact: Waste impacts by means of waste storage and littering during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Traffic Impacts:					
Nature of impact: Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Fire Risk Impacts:					
Nature of impact: Increase risk of fires during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
	Preferred Layout Alternative		Layout Alternative 2		

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Potential Soil Contamination Impacts:					
Nature of impact: Increased Soil contamination by means of hazardous substances.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Soil Erosion Impacts:					
Nature of impact: Increased Soil erosion due to construction activities.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Visual Impacts:					
Nature of impact: Increased visual impact due to increased working activities on-site.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Socio-Economic Impacts:					
Nature of impact: Increased socio-economic conditions due to job creation				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)

Operational Phase

OPPERATIONAL PHASE					
Potential Flora Impacts:					
Nature of impact: Direct impact on flora as a result of Alien invasive species establishment				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Impeding of the ecological connectivity and functionality of the broader remaining natural area				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Fauna and Avifauna Impacts:					
Nature of impact: Continuous impact on Fauna as a result of cleared vegetation / habitat loss.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Dust Impacts:					
Nature of impact: Dust nuisance generated during the operational phase of the project.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Noise Impacts:					
Nature of impact: Noise nuisance generated during the operational phase of the pivots.				Activity: Proposed development of seed potato pivots	

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Cultural and Heritage Impacts:					
Nature of impact: Damage and destruction of vertebrate fossils during the operational phase.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:					
Nature of impact: Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Impeding and contamination of the surface water catchment and drainage area towards the south			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Waste Management Impacts:					
Nature of impact: Waste impacts by means of waste storage and littering during the operational phase of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Traffic Impacts:					

Nature of impact: Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Fire Risk Impacts:					
Nature of impact: Increase risk of fires during the operational phase of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Potential Soil Contamination Impacts:					
Nature of impact: Increased Soil contamination by means of hazardous substances.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Soil Erosion Impacts:					
Nature of impact: Increased Soil erosion due to operational activities.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Potential Visual Impacts:					
Nature of impact: Increased visual impact due to increased working activities during the operational phase.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	

Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Water Usage Impacts:					
Nature of impact: Impact on water usage due to over extraction from groundwater.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Socio-Economic Impacts:					
Nature of impact: Increased socio-economic conditions due to job creation				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)

Decommissioning Phase

DECOMMISSION PHASE					
Potential Dust Impacts:					
Nature of impact: Dust nuisance generated during the decommissioning phase of the project.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:					
Nature of impact: Surface and Groundwater Contamination during the decommissioning phase by means of fertilizer and/or any other hazardous substances or pesticides.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Waste Management Impacts:					
Nature of impact: Waste impacts by means of waste storage and littering during the decommissions phase of the pivots.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Soil Contamination Impacts:					
Nature of impact: Increased Soil contamination by means of hazardous substances.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Soil Erosion Impacts:					
Nature of impact: Increased Soil erosion due to decommissioning activities.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Potential Socio-Economic Impacts:					
Nature of impact: Increased socio-economic conditions due to job loss				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)

SUMMARY OF SPECIALIST STUDIES

The section below outlines the main finding of all specialists involved in the Scoping & EIA process. More detailed insight may be gathered from the specialist report which is attached as Appendix E.

Ecological and Wetland Specialist study

It is in the opinion of the specialist that the only significant potential ecological impact identified and which cannot necessarily be suitably reduced and mitigated to within acceptable levels, is the removal of a significant number of tree/shrub individuals of the nationally protected species *Vachellia haematoxylon*. This potential ecological impact scored a slightly higher risk rating for Alternative 1 (preferred) than for Alternative 2 due to the additional approximate 19 ha footprint. The Department of Agriculture, Forestry and Fisheries (DAFF) should therefore be notified and adequately consulted during the Public Participation Process in order to obtain their comment and recommendations with regards to the viability of the proposed development. The rest of the potential ecological impacts identified can be suitably reduced and mitigated to within acceptable levels and the project should therefore be considered by the competent authority for environmental authorisation and approval. Although Alternative 1 (preferred) scored a slightly higher risk rating than Alternative 2, the difference in ecological impact is not deemed significant due to the small relative increase in transformed footprint. Either of the alternatives can therefore be considered by the competent authority depending on the comment and recommendations received from DAFF.

The proposed project may only continue if all recommended mitigations measures as per this ecological report are adequately implemented and managed for both the construction and operational phases of the proposed project. All necessary authorisations and permits must also be obtained prior to any commencement.

Heritage Specialist study

The study area is located within a historically as well as prehistorically significant landscape. However, the field assessment indicates that the proposed pivot development will primarily affect geologically recent soils in the form of well-developed wind-blown sand. The base of aeolian Kalahari Group sands, which cover vast areas in the region, have previously produced localized densities of Early and Middle Stone Age artefacts, but given the apparently sterile condition of the test pits and the fact that pivot farming largely effect the uppermost soil layer, impact on potentially intact Stone Age archaeological remains within the footprint is considered very low. Given the nature of the proposed development (installation of aboveground pivots), the terrain is not considered archaeologically vulnerable and is assigned a site rating of Generally Protected C.

Soil Suitability Study

The soils of the study area are dominated by the Hutton soil form, an apedal red soil which is well drained. Most of the Hutton soils had loose stones in their deep subsoil, but as this material is also well drained, it was also regarded as suitable for irrigation. One observation, representing approximately 1 ha, was a Bloemdal soil

observation. The Bloemdal soil form is insufficiently drained and poses a threat of water logging under irrigation conditions. The soil pH is acidic and lime should be applied before planting commences. Salinity is not a threat; as very low EC values were measured. Sodicity is on the threshold values, and should be managed. Liming and irrigation will control the ESP values. As the Bloemdal area is very small (1 ha) the entire site is regarded to comply with the irrigation guidelines of the Northern Cape Department of Agriculture

The soil samples tested have clay percentages of less than 15%, leading to freely drained and well aerated soils, ideal for potato production. The texture classifications are all within the classes Sand, Loamy Sand and Sandy Loam, which are the most ideal texture classes for potato production.

The pH values generally are acidic, between 4.4 and 5.8, measured in KCl. This is too acidic for potatoes, but it can be corrected easily with lime application. Liming should be done before planting commences.

Based on the soil morphology and laboratory analysis, the area shown below is suitable for irrigation according to the norms of the Department of Agriculture, Northern Cape.



Suitable Irrigation soil on the Farm Reliance No. 347

CONCLUSION

No significant red flag impacts were noted during the respective assessment phase of the project. Both the ecological and Soil suitability reports and the Heritage study have not indicated any fatal flaws. Although Alternative 1 (preferred) scored a slightly higher risk rating than Alternative 2, the difference in ecological impact is not deemed significant due to the small relative increase in transformed footprint. Either of the alternatives can therefore be considered by the competent authority depending on the comment and recommendations received from DAFF.

From an Independent Environmental Assessment Practitioners point of view, an approval of the impact assessment report is highly recommended.

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ABBREVIATIONS

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CEL	Cost Estimate Letter
CIA	Cumulative Impact Assessment
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CPA	Communal Property Association
CRR	Comments and Responses Report
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DENC	Department of Environment and Nature Conservation
DM	District Municipality
DMR	Department of Mineral Resources
DoE	Department of Energy
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
FSR	Final Scoping Report
Ha	Hectares
HTF	Heat Transfer Fluid
I & APs	Interested and Affected Parties
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolt
LED	Local Economic Development
LM	Local Municipality
LSA	Late Stone Age

MAP	Mean Annual Precipitation
MASL	Metres Above Sea Level
MLL	Minimum living level
MSA	Middle Stone Age
MVA	Megavolt ampere
MW	Megawatt
NCPSDF	Northern Cape Provincial Spatial Development Framework
NDP	National Development Plan
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMWA	National Environmental Management: Waste Act (Act 59 of 2008)
NERSA	National Energy Regulator of South Africa
NFA	National Forests Act (Act 84 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NIP	National Infrastructure Plan
NWA	National Water Act (Act 36 of 1998)
PFS	Pre-feasibility Study
PPP	Public Participation Process
PUC	Point of Utility Connection
PoSEIA	Plan of Study for Environmental Impact Assessment
REIPPP	Renewable Energy Independent Power Producers Procurement Programme
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SIA	Social Impact Assessment
SIP	Strategic Integrated Project
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
WRYCM	Water Resource Yield Computer Model
WULA	Water Use Licence Application

1. INTRODUCTION

The agricultural industry forms a significant part of the annual GDP of the Republic of South Africa. Agriculture primarily contributes in the form of food national production and security and through import and export process as well as primary and secondary employment creation.

The company Secundis Beleggings (Pty) Ltd. is proposing to commence with the process of procuring the Remaining Extent of the Farm Reliance No. 347 near the town of Griekwastad in the Northern Cape Province (135 ha). The reason for the intended procurement is for establishing fourteen (14) seed potato farming pivots on the farm of natural previously uncultivated land.

It has to be noted that the seed potato pivot preparation and planting/development phase will take approximately 8 years to be complete and will continue to follow an 8-year rotation cycle. In other words, not all pivots will be planted simultaneously. After each season, each pivot will be rehabilitated using buffalo grass and will remain dormant/inactive for a period of 7 years, before planting will again commence on the pivot. This cycle will continue.

The completion of the farm portion procurement process is however dependent on a number of factors. The major conditional factors are the suitability of the area for seed potatoes (soil, water, transformation of natural resources, heritage significance) as well as the successful acquisition of an environmental authorisation (EA) from the competent authority. The Northern Cape Department of Environment and Nature Conservation has in this case been identified as the competent authority.

In accordance with the National Environmental Management Act (Act 107 of 1998); Environmental Impact Assessment Regulations of 2017, a full Scoping & Environmental Impact Assessment (EIA) processes is required for the proposed project in order to obtain the necessary environmental authorisation from the competent authority. Eco-Con Environmental was appointed by the owner of Secundis Beleggings (Pty) Ltd. to act as the independent Environmental Assessment Practitioner (EAP) to facilitate the entire environmental authorisation application process and complete the full Scoping & EIA processes for the construction and operational phases of the proposed project.

The following report aims to give context to the proposed development through providing a comprehensive description of the envisaged activities and relevant infrastructure; the identification of significant environmental impacts associated to the proposed project; identification of appropriate alternatives and mitigation measures for reduction of undesired impacts; and communication of results in a clear and concise manner to the competent authority and other relevant parties.

1.1 PROJECT APPLICANT INFORMATION

Table 1: Project applicant information

Company/entity name:	Secundis Beleggings (Pty) Ltd
Registration number:	2015/044739/07
Physical address:	12 McClintock Street, Kimberley
Postal address:	12 McClintock Street, Kimberley
Contact person:	Mr. Hennie Stander
ID number:	7708245056081
Designation:	Owner
Contact number:	078 451 0922
E-mail address:	hennie@hencar.co.za

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1 DETAILS OF THE EAP

Eco-Con Environmental (Pty) Ltd. was appointed by Secundis Beleggings (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to conduct a full Scoping & EIA process for the proposed project.

Eco-Con Environmental was established in May 2017. Although the formal establishment of the company took place in 2017, it is backed by more than 15 years of collective professional service and experience in the environmental field. The qualifications, expertise and experience of our professional team form the backbone of the company's continued success.

The vision of Eco-Con Environmental is being dedicated to environmental management that fosters a sustainable future and leads to improvements in the communities where we do business. Eco-Con Environmental believes that in time we will become the most respected Environmental Management Consultancy firm in all regions where we work.

The company continuously engages existing and emerging legislation, guidelines and practices in order to ensure the execution of high quality and appropriate studies. Through an integration of skills and expertise, it is envisioned that Eco-Con Environmental will deliver exceptional, competitive services for task execution and to meet deliverables. Eco-Con Environmental, through years of experience and industry presence, assures the seamless execution and roll out of tasks to achieve projected results on time. Our past experience on agricultural projects further benefits our understanding of the required and associated processes and the impacts thereof.

Table 2: Details of the EAP

Company/entity name:	Eco-Con Environmental (Pty) Ltd.
Physical address:	5 Chris Barnard Street, Langenhovenpark, Bloemfontein, 9301
Postal address:	P.O Box 37452, Langenhovenpark, 9330
Contact person:	Mr. Johan Botes
Designation:	Senior Environmental Consultant and Managing Director
Contact number:	082 459 8206
E-mail address:	johan@eco-con.co.za
Qualifications:	B.A Honours in Geography – UFS B.A Geography and Environmental Management - UFS

2.2 EXPERTISE OF THE EAP REPRESENTATIVE

Johan Botes, is a Senior Environmental Specialist Consultant and Managing Director at Eco-Con Environmental (Pty) Ltd. His qualifications include an Honours degree in Geography from the University of the Free State and a Bachelors of Arts in Geography and Environmental Management also from the University of the Free State. Johan Botes has 7 years of environmental management experience. Johan also brings with him a strong background in environmental law and monitoring. He was previously employed at Enviroworks and Savannah Environmental Consultants as a General Manager and Environmental Control Officer respectively.

Relevant Project Experience

Project Management Experience

- Conducting of Environmental Impact Assessment Report for the proposed 45MW Meerkat Hydro Power Facility in the Northern Cape.
- Conducting of Environmental Impact Assessment Report for the proposed 150MW PV Metsimatala Solar Power Project in the Northern Cape.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation in and around the town of Lephalale on behalf of NEOTEL.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation in and around the town of Thohoyandou on behalf of NEOTEL.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation in and around the town of Groblersdal on behalf of NEOTEL.
- Conducting of Basic Assessment processes for the proposed upgrading and widening of Nathen Bridge in Blomfontein on behalf of the Mangaung Metropolitan Municipality
- Conducting of Basic Assessment processes for the proposed construction of two new roads and the upgrading of one existing road in Botshabeo on behalf of the Mangaung Metropolitan Municipality.

Environmental Impact Assessment Experience

- Conducting of Environmental Impact Assessment Report for the proposed 180 hectare Cecilia Park Residential development in Bloemfontein on behalf of Mzansi Africa Civils Engineering.
- Conducting of Environmental Impact Assessment Report for the proposed construction of a steel galvanizing plant in Botshebelo, Free State Province on behalf of Bombenero Investments.
- Conducting of Environmental Impact Assessment Report for the proposed opening of 3 borrow pits and 1 gravel quarry around the Ladybrand area, Free State Province.

Basic Assessment Experience

- Conducting of Basic Assessment report for the proposed construction of the Lucas Steyn Filling station in Bloemfontein, Free State Province.
- Conducting of Basic Assessment report for the proposed construction of Gabions in the Bath River in Caledon, Western Cape Province.
- Conducting of Basic Assessment report for the proposed expansion of the Nicsha Petroleum Depot in Bloemfontein, Free State Province.
- Conducting of Basic Assessment report for the proposed Fuel Zone Petroleum Depot in Welkom, Free State Province.
- Conducting of Section 24 G Rectification application for the already established residential development on the farm Proteahof 217, Delportshoop, Northern Cape.
- Conducting of Basic Assessment processes for the proposed opening of 9 borrow pits around the Ladybrand area, Free State Province.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation between Prince Albert and Oudtshoorn on behalf of NEOTEL.
- Conducting of Basic Assessment report for the proposed Nooitgedach Retirement Village in White River, Mpumalanga.
- Conducting of Basic Assessment processes for the proposed construction of 19 signalling masts in the railway reserves of Cape Town and Stellenbosch on behalf of the Passenger Rail Association of South Africa (PRASA).
- Conducting of Basic Assessment processes for the proposed construction of 1 signalling mast in the railway reserve at St James Station, Cape Town on behalf of the Passenger Rail Association of South Africa (PRASA).
- Conducting of Basic Assessment processes for the proposed construction of 1 signalling mast in the railway reserve at Clovelly Station, Cape Town on behalf of the Passenger Rail Association of South Africa (PRASA).
- Conducting of Basic Assessment processes for the proposed upgrading and widening of Nathen Bridge in Bloemfontein on behalf of the Mangaung Metropolitan Municipality.
- Conducting of Basic Assessment processes for the proposed construction of two new roads and the upgrading of one existing road in Botshabeo on behalf of the Mangaung Metropolitan Municipality.

Experience in Auditing and as an Environmental Control Officer

- Annual Environmental Audit in Terms of Section 34 of Government Notice 982 for the Mission Point Mining near Sasolburg, Free State Province.

- Environmental Gap Audit for the Meadow Meats Abattoir in Vryheid, KwaZulu-Natal.
- Environmental Gap Audit for the Meadow Meats Abattoir in Wesselbron, Free State Province.
- Environmental Control Officer (ECO) for the Mission Point Sand Mining facility near Sasolburg, Free State Province.
- Environmental Control Officer (ECO) for the Rooikraal Truck stop facility near Vrede, Free State Province.
- Environmental Control Officer (ECO) for the widening of bridge structures over the Orange River for BVi on behalf of SANRAL, near Hopetown, Northern Cape
- Environmental Control Officer (ECO) for the construction of a 2.7 km Bus route, Thaba Nchu, Free State Province.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Nelspruit on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the construction of the Khi Solar One Concentrated Solar Power facility near Upington.
- Environmental as an Environmental Control Officer (ECO) for the construction of a 132kV Substation in Bloemfontein for Dihlase Consulting Engineers.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Thohoyandou on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Lephaale on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Grobersdal on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Kathu on behalf of NEOTEL.

Experience in Permits and Licencing

- Water Use Licence Application for the installation of carbon optic fibre cable within 32 metres of a watercourse on behalf of NEOTEL.
- Water Use Licence Application (General Authorisation) for the installation of carbon optic fibre cable within 500 metres of a wetland on behalf of NEOTEL.
- Waste Management Licence for the storage and reuse of hazardous waste water for the Bombenero Galvanizing Steel Facility in Botshabelo, Free State Province on behalf of Bombenero Investments.

Experience in Environmental Risk Assessments

- Conducting of Environmental Risk Assessment for the proposed establishment of a Diesel Depot in Welkom, Free State Province.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Groblersdal on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Lephalale on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Thohoyandou on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Nelspruit on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Kathu on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Groblersdal on behalf of NEOTEL.

Other Experience

- Compilation of Fire Management Plan for the Proposed 150MW Metsimatale CSP Facility, Postmansburg, Northern Cape.
- Calculating Financial Provisions (Quantum Calculations) for the Mission Point Mining near Sasolburg, Free State Province.
- Compilation of construction and operational phase Waste Management Plan for the proposed Cecilia Park Residential Development, Bloemfontein, Free State Province.
- Training of construction personnel and environmental advisory services for personnel of the Khi Solar One Concentrated Solar Power facility near Upington.
- GIS mapping and technical support for various projects, including the drawing of locality and sensitivity maps.
- Public participation processes and assistance to several projects.
- Compilation of Bitumen Waste Report for Penny Farthing Engineering, Venterstad, Eastern Cape.

See Appendix A for Curriculum Vitae of the EAP.

2.3 PUBLIC PARTICIPATION OFFICER

The entire Public Participation Process for the Scoping as well as EIA phases will also be conducted and coordinated by Mr. Johan Botes.

See Appendix A for Curriculum Vitae.

3. RELEVANT ENVIRONMENTAL LEGISLATION AND GUIDELINES

3.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (ACT 108 OF 1996)

Section 24 of the Constitution of South Africa provides the main national legislative obligation towards sustainable environmental management and development. This section forms the foundation of all other subsequent environmental legislation and governance in South Africa. Section 24 states the following:

every person shall have the right -

- (a) to an environment that is not harmful to their health nor well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that -
 - (i) prevent pollution and ecological degradation;
 - (ii) promote conservation; and
 - (i) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The following sections provide an overview of the relevant environmental legislation and guideline documents applicable to the proposed project.

3.2 OTHER RELEVANT ENVIRONMENTAL LEGISLATION

Aside from NEMA, other key environmental legislation, policies, plans and guidelines will also be triggered by the proposed project, whilst others shall provide strategic goals and priorities for different resources and sectors.

The environmental legislation relevant to the proposed project and which has been taken into account in the preparation of the Final Scoping Report is summarised below:

3.2.1 National

3.2.1.1 National Environmental Management Act (Act 107 of 1998) (NEMA)

NEMA is the principle/framework legislation governing EIA and subsequent EA processes under the authority of the National Department of Environmental Affairs.

NEMA makes provisions for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment; institutions that will promote co-operative governance;

procedures for co-ordinating environmental functions exercised by Organs of State and to provide for matters connected therewith.

Section 2 of the Act establishes a set of principles, which apply to the activities of all Organs of State that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised and positive impacts enhanced; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its entire life cycle.

These principles are taken into consideration when a Governmental Department needs to exercise its powers for example, during the processes of granting permits or Environmental Authorisations or the enforcement of existing legislation or conditions of approval.

Section 23 of NEMA furthermore provides for general objectives of Integrated Environmental Management. In alignment with these objectives, the potential impacts on the biophysical and socio-economic environments are identified and evaluated. These potential environmental impacts have been assessed during the Scoping Report phase and mitigation measures are provided where relevant.

The subsequent Environmental Impact Assessment Regulations, 2017 (Government Notices R327, R325 and R324 of April 2017, which are also referred to as Listing Notices 1, 2 and 3 respectively, list development activities which will trigger the necessity to conduct either a Basic Assessment or a full Scoping & EIA process prior to EA being obtained for a proposed project. Listing notices 1 & 3 activities require only a Basic Assessment to be conducted while Listing notice 2 activities trigger the requirement for a full Scoping & EIA process to be conducted.

Considering the nature and scale of the development activities triggered by the proposed project, it was required that a full Scoping & EIA process be conducted to provide sufficient information to the competent authority in order for them to make an informed decision regarding the approval or rejection of the EA applied for.

Only once the EA is granted and the required supporting permits have been issued, may the applicant lawfully commence with the proposed project. The Scoping & EIA process is therefore a critical component in the feasibility and planning stage of any proposed project.

3.2.1.2 National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA)

NEMBA aims to provide for the management and conservation of the country's rich biodiversity within the framework of NEMA. It aids in the protection of species and ecosystems which warrant national protection and provides for the sustainable usage of the country's indigenous biological resources.

NEMBA and its Regulations was therefore utilised for determining the ecological/biodiversity significance, value and subsequently the adequate management of the proposed project area with regards to ecosystems, habitats and individual species.

The Department of Environmental Affairs is responsible for the implementation and overseeing of this legislation along with the South African National Biodiversity Institute (SANBI).

3.2.1.3 National Forests Act (Act 84 of 1998) (NFA)

The aim of the NFA is to promote the sustainable usage, management and development of forests for the benefit of all in South Africa. The Act also makes special provisions for the protection of specific forests and tree species which duly require formal protection in order to ensure their prolonged existence.

The National Forests Act was therefore utilised to determine the potential presence of any protected forests or tree species in the proposed project area in order to ensure that the correct processes are followed for the approval of any listed activities for which a permit may be necessary regarding such forests or species, should it be required.

Permit applications in terms of the National Forests Act are lodged with the Department of Agriculture, Forestry and Fisheries.

3.2.1.4 Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA)

CARA aims to provide for the protection and control over utilisation of the country's agricultural resources in order to promote conservation of soils, water and natural vegetation as well as the combatting of weeds and invader plants. Sustainable utilisation is a key objective.

CARA was therefore used for determining the agricultural significance, value and subsequently the adequate management of the proposed project area.

It is overseen by The Department of Agriculture, Land Reform and Rural Development in the Northern Cape Province.

3.2.1.5 National Water Act (Act 36 of 1998) (NWA)

The NWA aims to ensure sustainable use of water through the protection of the quality of water resources for the benefit of all water users. Its principal focus is the rectification and equitable allocation and use of the scarce and disproportionately distributed water resources of South Africa.

The property of the proposed project has standing water rights which allows the owner to extract from the Riet River. Section 21 of NWA defines the types of water uses which require a Water Use License to be applied for. The Act stipulates that a Water Use License Application must be submitted if a development takes place within 500 m of a natural watercourse.

The Department of Water and Sanitation is responsible for the implementation and overseeing of this legislation and is also the responsible authority for the issuing of permits for water use.

3.2.1.6 National Heritage Resources Act (Act 25 of 1999) (NHRA)

The NHRA aims to provide for the integrated and interactive management and conservation of the national heritage resources in South Africa so that they may be bequeathed for future generations.

Section 38 lists categorised development processes which require the South African Heritage Resources Agency (SAHRA) to be notified and furnished with an archaeological and palaeontological study of a proposed project area in order to obtain project authorisation. The following development processes are triggered during the construction and operational phases of the proposed project:

- (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as -
 - (c) any development or other activity which will change the character of a site -
 - (i) exceeding 5 000m² in extent; or

The South African Heritage Resources Agency (SAHRA) has a mandate, in terms of the NHRA, to enforce the conditions of the NHRA, and hence oversees the management of heritage resources together with provincial heritage agencies.

3.2.1.7 National Development Plan – 2030 (NDP)

The executive summary of the National Development Plan (NDP) initiates with the following paragraph, *“The National Development Plan aims to eliminate poverty and reduce inequality by 2030. South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.”*

Chapter 6 of the NDP specifically discusses the role and importance of commercial agriculture in the success of the country's economy and reaching the objectives of the NDP. It discusses the potential associated with the expansion of irrigated land towards food security and also job creation and capacity building (skills development and experience).

The development of the proposed potato pivots therefore be beneficial in terms of the goals/objectives described with regards to agriculture in the NDP.

3.2.2 Provincial

3.2.2.1 Northern Cape Nature Conservation Act (Act 9 of 2009)

In addition to the NFA, the Northern Cape Nature Conservation Act also makes provision for the protection and sustainable utilisation of wild animals, aquatic biota and plants on a provincial scale in the Northern Cape Province. It is therefore used in conjunction with the NFA to determine the ecological/biodiversity significance, value and subsequent management of the proposed project area.

The Northern Cape Nature Conservation Act was utilised to determine the potential presence of any provincially protected or specially protected species in the proposed project area in order to ensure that the correct processes are followed for the approval of any listed activities for which a permit may be necessary regarding such species, should it be required.

Permit applications in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009) are lodged with the relevant provincial authority, which in this case is the Department of Environment and Nature Conservation in the Northern Cape Province.

3.2.2.2 Northern Cape Provincial Spatial Development Framework

The Northern Cape Provincial Spatial Development Framework (NCPSDF) was formulated in 2011 to meet the requirements of the Northern Cape Planning and Development Act, 1998 (Act 7 of 1998) and the Municipal Systems Act, 2000 (Act 32 of 2000). Prepared in accordance with a bioregional planning approach adapted to suit the site-specific requirements of the Northern Cape, the NCPSDF recognises that no region or area should be planned and managed as an 'island' in isolation from its surroundings. Together, unit areas form part of the broader environment and the mutual relationships and linkages between adjacent units must be understood and applied.

The framework aims to act as a policy and strategy providing direction and guidance for:

- future land use,

- spatial context for provincial sectoral strategies,
- promoting a developmental state,
- alignment of environmental management priorities, and
- mobilising the overarching objective of the Northern Cape Provincial Growth and Development Strategy (PGDS) to build prosperous, sustainable and growing provincial economy to eradicate poverty and improves social development.

A focus for achieving sustainable development as discussed in the framework, requires four areas of capital, being environmental, human, infrastructure and monetary. The plan further stresses the need for integrative participation, positive interventions and innovative finance. The SDF makes specific reference to the importance of agriculture and capacity increase in this sector in the Northern Cape Province.

The proposed project will make a positive contribution towards various objectives of the SDF.

3.2.2.3 Northern Cape Provincial Growth and Development Strategy (NCPGDS)

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) (2004 – 2014) highlights the most significant growth and development challenge as the reduction of poverty, and that only through long-term sustainable economic growth and development shall this be achieved. Important areas where growth can be achieved include agriculture and agro-processing, transport and tourism. In support of such growth areas the creation of opportunities for life-long learning, improvement of labour force skills to enhance productivity and expanding access to education and knowledge shall lead to the further realisation of such growth. Specialist

The inclusion of macro-level objectives shall mobilize these primary growth areas. Such objectives include the developing of human and social capital, improving the efficiency and effectiveness of governance and associated institutions and enhancing infrastructure for economic growth and development.

3.2.3 District and Local

3.2.3.1 Pixley Ka Seme District Municipality Integrated Development Plan 2017-2022

The District Municipality has developed its vision, development priorities, objectives and strategies with specific outcomes and outputs for the 2017-2022 financial year.

Vision

"Developed and Sustainable District for Future Generations."

Mission

The Pixley Ka Seme District Municipality will achieve its vision by:

- Supporting our local municipalities to create a home for all in our towns; settlements and rural areas to render dedicated services;
- Providing political and administrative leadership and direction in the development planning process;
- Promoting economic growth that is shared across and within communities;
- Promoting and enhancing integrated development planning in the operations of our municipalities; and
- Aligning development initiatives in the district to the National Development Plan.

The proposed project will be able to contribute positively to these objectives through job creation and sustainable capacity building (skills development and experience).

3.2.3.2 Siyancuma local municipality Integrated Development Plan 2015/2016

The following vision and mission is engrained into the Integrated Development Plan (IDP) of the Siyancuma local municipality

Vision

We Siyancuma Municipality commit ourselves to be a sustainable, economically viable, developmental municipality where the community enjoys a high quality of life.

Mission

We will Strive to put the needs of the community first by:

- To economically and socially develop the municipal area;
- Empower the community through transparent, accountable democratic governance and sound financial management
- By utilizing all available resources and human skills.

The proposed project will be able to contribute positively to these objectives through job creation and sustainable capacity building (skills development and experience).

3.3 RELEVANT GUIDELINES

The table (table 3) below lists the Guideline Documents that are applicable to the proposed project, and which are considered as part of the EIA process, as are required in terms of the NEMA EIA Regulations; 2017.

Table 3: Applicable guideline documents

1	DETEA EIA Guideline and Information Document Series
1.1	<i>Draft Guideline on the Need and Desirability in terms of the EIA Regulations of 2010.</i> Integrated Environmental Management Guideline Series 9, Government Notice 792 of 2012.
2	DEA & DP EIA Guideline and Information Document Series
2.1	<i>Guideline on Generic Terms of Reference for EAPs and Project Schedules,</i> EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning, March 2013.
2.2	<i>Guideline on Need and Desirability,</i> EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning, March 2013.
2.3	<i>Guideline on Alternatives,</i> EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning, March 2013.
2.4	<i>Guideline on Public Participation,</i> EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning, March 2013.
3	DEA&DP Guideline Document Series for Involving Specialists in the EIA Process, and others
3.1	<i>Guideline for Environmental Management Plans.</i> CSIR Report No ENV-S-C2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town (Lochner, P. 2005).

3.4 NEMA LISTED ACTIVITIES TRIGGERED BY THE PROPOSED PROJECT

The development activities in the National Environmental Management Act (Act 107 of 1998): Environmental Impact Assessment Regulations, 2017 (Government Notices R327, R325 and R324) which are triggered by the proposed project are listed in the table (table 4) below:

Table 4: Environmental Impact Assessment Regulations, 2017 listed activities triggered by the proposed project

Regulation	Activity	Description of trigger activity in proposed project
GN. R. 325 Listing Notice 2	Activity 13 The physical alteration of virgin soil to agriculture, or afforestation for the purposes of commercial tree, timber or wood production of 100 hectares or more.	Cultivation and establishment of 18 seed potato pivots of approximately 450 ha of natural vegetation. The total size of the farm portion to be impacted by roads and associated infrastructure of the proposed

		project is approximately 450 ha.
GN. R. 325 Listing Notice 2	Activity 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.	Cultivation and establishment of 18 seed potato pivots of approximately 450 ha of natural vegetation. The total size of the farm portion to be impacted by roads and associated infrastructure of the proposed project is approximately 450 ha.

3.5 NEMA REGULATION 23 IMPACT ASSESSMENT REPORT INFORMATION COMPLIANCE

Regulation 23(3) of the Environmental Impact Assessment Regulations, 2017 (R326) refers to Appendix 3 which provides the content requirements for an Impact Assessment Report.

The table below (table 5) lists the relevant requirements for the Impact Assessment Report as per Appendix 3 of the Regulations as well as providing cross-references to where the relevant information is located in this document and/or its appendices.

Table 5: Information required in the Impact Assessment Report as per Appendix 3 of GN R. 326 of the EIA Regulations, 2017

EIA Regulations 2017 - Appendix 3 – Scope of assessment and content of environmental impact assessment reports	Location in this document
(a) details of-	
(i) the EAP who prepared the report; and	Section 2.1
(ii) the expertise of the EAP, including a curriculum vitae;	Section 2.2
(b) the location of the activity, including-	Section 4.1
(i) the 21 digit Surveyor General code of each cadastral land parcel;	Section 4.1
(ii) where available, the physical address and farm name;	Section 4.1
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 4.1
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Section 4.1
(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	N/A
(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	N/A
(d) a description of the scope of the proposed activity, including-	
(i) all listed and specified activities triggered and being applied for; and	Section 3.4

(ii) a description of the associated structures and infrastructure related to the development;	Section 4.2
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Section 3
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 5
(h) a full description of the process followed to reach the proposed development footprint within the approved site, including:	Section 4.1
(i) details of the development footprint alternatives considered;	Section 6
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 8
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 8
(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
(v) the impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 9
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 9.1
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9.2
(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 9.2
(ix) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	N/A
(x) a concluding statement indicating the preferred alternative development location within the approved site;	Section 9.6
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity the associated structures and infrastructure will impose on the preferred location through the life of the activity including:	Section 9
(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and;	Section 9.2
(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 9.4

(j) an assessment of each identified potentially significant impact and risk, including;	Section 9.4
i) cumulative impacts	Section 9.4
ii) the nature, significance and consequences of the impact and risk;	Section 9.
iii) the extent and duration of the impact and risk	Section 9.
iv) the probability of the impact and risk occurring	Section 9.4
v) the degree to which the impact and risk can be reversed	Section 9.4
vi) the degree to which the impact and risk may cause irreplaceable loss of resources and;	Section 9.4
vii) the degree to which the impact and risk can be mitigated	Section 9.4
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report	Section 7
(l) an environmental impact statement which contains-	Section 11.2
i) a summary of the key findings of the environmental impact assessment:	Section 11.2
ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and;	Section 7 Appendix B
iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 9.3
(m) based on the assessment and where applicable, recommendations from specialist reports, the recording of proposed management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation	Section 7
(n) the final proposed alternatives which respond to the impact management measures, avoidance and mitigation measures identified through the assessment	Section 9.4 Section 11.1
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are not to be included as conditions of authorisation	N/A
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 10
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of the authorisation	Section 11
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	N/A
(s) an undertaking under oath or affirmation by the EAP in relation to-	Appendix D
(i) the correctness of the information provided in the report;	

(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	Appendix C
iii) the inclusion of inputs and recommendations from the specialist reports where relevant	Appendix E
(iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Appendix C
(t) where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts	N/A
(u) an indication of any deviation from the approved scoping report, including the plan of study including-	N/A
i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks and	N/A
ii) a motivation for the deviation	N/A
(v) any specific information that may be required by the competent authority and	N/A
(w) any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

4. PROJECT LOCATION AND DESCRIPTION

The following section provides an overview of the proposed project location as well as a detailed description of the proposed project.

4.1 PROJECT LOCATION

The proposed project area is approximately 219 ha in surface size and is situated on the Remaining Extent of the Farm Reliance No. 347 (SG 21 Digit Code: C03100000000034700000). The proposed water pipeline will also be located on the above property and will not traverse any other portions or farms. The farm is located approximately 11km North-West of the town of Griekwastad. The property falls inside the Siyancuma local Municipality which, in turn, forms part of the greater Pixley Ka Seme District Municipality. Access to the proposed project area is obtained by way of the R 325 provincial road and a subsequent dirt road.

Table 6: Farm name and Number with SG code and Landowner name

Farm Name and Number	SG 21 Digit Code	Land owner
Remaining Extent of the Farm Reliance No. 347	C03100000000034700000	Secundis Beleggings (Pty) Ltd.

(See Appendix F for the title deeds)

Title deed number for the Remaining extent of the Farm Reliance No. 347 is: T3442/2017

The corner coordinate points for the corners of the proposed properties are as follows:

The study area on the Farm Reliance No. 347:

- Northern-eastern corner 28°44'32.38"S; 23°13'17.50"E
- North-western Corner 28°44'29.42"S; 23°11'56.77"E
- South-eastern corner 28°45'36.77"S; 23°12'54.17"E
- South-western corner 28°45'37.34"S; 23°12'25.63"E

The centre points of all the **Alternative 1** pivots are as follows:

7 X 3 hectare Pivots:

- Pivot 1 - 28°44'34.27"S; 23°12'3.61"E
- Pivot 2 - 28°45'8.88"S; 23°12'21.20"E
- Pivot 3 - 28°45'15.38"S; 23°12'23.76"E
- Pivot 4 - 28°45'21.45"S; 23°12'26.58"E

- Pivot 5 - 28°45'27.66"S; 23°12'29.26"E
- Pivot 6 - 28°45'33.96"S; 23°12'31.57"E
- Pivot 7 - 28°44'50.30"S; 23°12'42.53"E

2 X 9.5 hectare Pivots:

- Pivot 1 - 28°44'33.04"S; 23°12'17.53"E
- Pivot 2 - 28°44'45.46"S; 23°12'22.12"E

5 X 19 hectare Pivots:

- Pivot 1 - 28°45'12.79"S; 23°12'38.09"E
- Pivot 2 - 28°45'29.88"S; 23°12'44.89"E
- Pivot 3 - 28°45'16.70"S; 23°12'56.10"E
- Pivot 4 - 28°44'58.78"S; 23°12'50.58"E
- Pivot 5 - 28°44'44.39"S; 23°12'58.90"E

The centre points of all the **Alternative 2** pivots are as follows:

7 X 3 hectare Pivots:

- Pivot 1 - 28°44'34.27"S; 23°12'3.61"E
- Pivot 2 - 28°45'8.88"S; 23°12'21.20"E
- Pivot 3 - 28°45'15.38"S; 23°12'23.76"E
- Pivot 4 - 28°45'21.45"S; 23°12'26.58"E
- Pivot 5 - 28°45'27.66"S; 23°12'29.26"E
- Pivot 6 - 28°45'33.96"S; 23°12'31.57"E
- Pivot 7 - 28°44'50.30"S; 23°12'42.53"E

2 X 9.5 hectare Pivots:

- Pivot 1 - 28°44'33.04"S; 23°12'17.53"E
- Pivot 2 - 28°44'45.46"S; 23°12'22.12"E

4 X 19 hectare Pivots:

- Pivot 1 - 28°45'12.79"S; 23°12'38.09"E
- Pivot 2 - 28°45'29.88"S; 23°12'44.89"E
- Pivot 3 - 28°45'16.70"S; 23°12'56.10"E
- Pivot 4 - 28°44'58.78"S; 23°12'50.58"E

The start, deviation and split points of the proposed **water pipeline route** are as follows:

- Start - 28°43'53.75"S; 23°10'23.88"E
- Deviation Point 1 - 28°44'18.52"S; 23°10'47.38"E
- Deviation Point 2 - 28°44'36.48"S; 23°11'20.14"E
- Deviation Point 3 - 28°44'33.91"S; 23°12'3.63"E

- Deviation Point 4 - 28°44'44.79"S; 23°12'11.78"E
- Deviation Point 5 - 28°44'52.53"S; 23°12'16.02"E
- Deviation Point 6 - 28°45'8.35"S; 23°12'21.31"E
- Deviation Point 7 - 28°44'45.59"S; 23°12'22.79"E
- Deviation Point 8 - 28°44'49.80"S; 23°12'42.62"E
- Split Point 1 - 28°44'37.17"S; 23°11'55.13"E
- Split Point 2 - 28°44'37.29"S; 23°12'6.59"E
- Split Point 3 - 28°44'56.75"S; 23°12'32.25"E
- Split Point 4 - 28°44'58.45"S; 23°12'50.90"E

Table 7: Details of relevant land owner

Company/entity name:	Secundis Beleggings (Pty) Ltd.
Postal address:	12 McClintock Street Kimberley
Contact person:	Mr. Hennie Stander
Designation:	Owner
Contact number:	078 451 0922
E-mail address:	hennie@hencar.co.za

A visual illustration of the proposed project area is provided in Figures 1 & 2 while the location of the proposed project area in relation to the nearby town, access roads and adjacent farms is illustrated on the locality map in Figure 3 below:



Figure 1: Image visually illustrating the general vegetation cover



Figure 2: Image visually illustrating the general vegetation cover

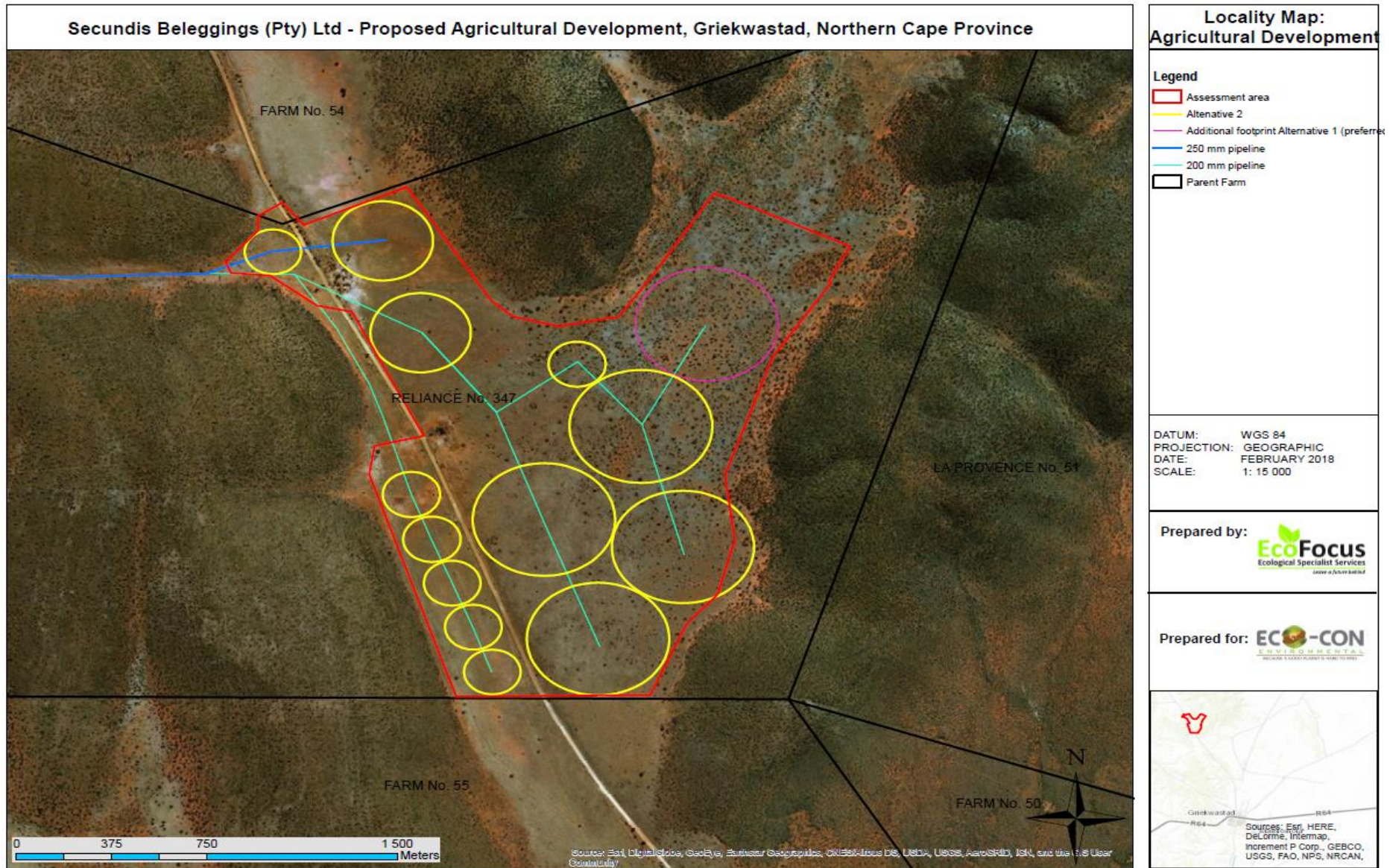


Figure 3: Locality map of the proposed project layout (see Appendix B for an A3 size version)

4.2 PROJECT DESCRIPTION

The company Secundis Beleggings (Pty) Ltd. is proposing to commence with the process of procuring the Remaining Extent of the Farm Reliance No. 347 near the town of Griekwastad in the Northern Cape Province (135 ha). The reason for the intended procurement is for establishing fourteen (14) seed potato farming pivots on the farm of natural previously uncultivated land.

It has to be noted that the seed potato pivot preparation and planting/development phase will take approximately 8 years to be complete and will continue to follow an 8-year rotation cycle. In other words, not all pivots will be planted simultaneously. After each season, each pivot will be rehabilitated using buffalo grass and will remain dormant/inactive for a period of 7 years, before planting will again commence on the pivot. This cycle will continue.

In order to achieve the above, two Layout Alternatives are proposed:

Site / Property Alternatives

An alternative viable site location was not identified and evaluated for the project. The specific proposed location for said project is preferred as it is the only viable portion of land available in that vicinity which is up for procurement. The landowner and the applicant is the same person / company and therefore no Procurements arrangements had to be made. The portion is also situated directly adjacent to the homestead of the intending developer/project applicant which is on the farm portion from where water will be obtained for irrigation through extraction from boreholes. This will render the project viable from an economic and logistic perspective.

Layout Alternatives

Two layout alternatives are however considered on the proposed project footprint and are summarised below:

Layout Alternative 1 (Preferred Alternative)

The preferred layout alternative includes the development of fourteen (14) seed potato pivots which will constitute 7 x approximate 3 ha cultivated pivot lands; 2 x approximate 9.5 ha cultivated pivot lands and 5 x approximate 19 ha cultivated pivot lands. This results in a total footprint area of approximately 135 ha in size. Six (6) of the 3 ha pivots are located towards the Eastern portion of the study area and is located east of the gravel road. The remaining pivots as per above description will all be located West of the gravel road.

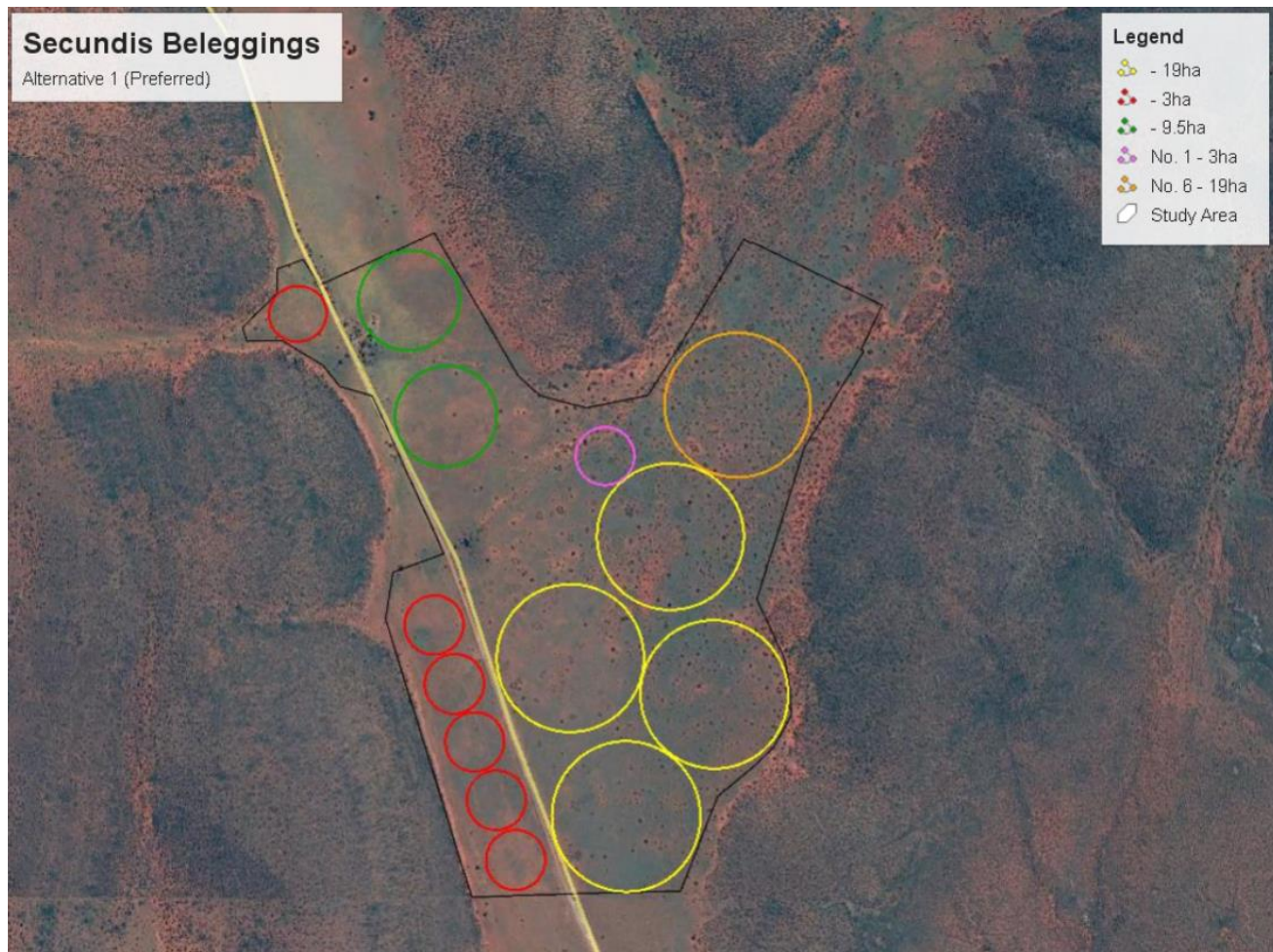


Figure 4: Secundis Beleggings Alternative 1 (Preferred Alternative)

Layout Alternative 2

Layout Alternative two includes the development of thirteen (13) seed potato pivots which will constitute 7 x approximate 3 ha cultivated pivot lands; 2 x approximate 9.5 ha cultivated pivot lands and 4 x approximate 19 ha cultivated pivot lands. This results in a total footprint area of approximately 116 ha in size. Six (6) of the 3 ha pivots are located towards the Eastern portion of the study area and is located east of the gravel road. The remaining pivots as per above description will all be located West of the gravel road. This alternative is the same as Alternative 1 (preferred) except for the exclusion of 1 x approximate 19 ha cultivated pivot land situated in the north-eastern corner of the assessment area.

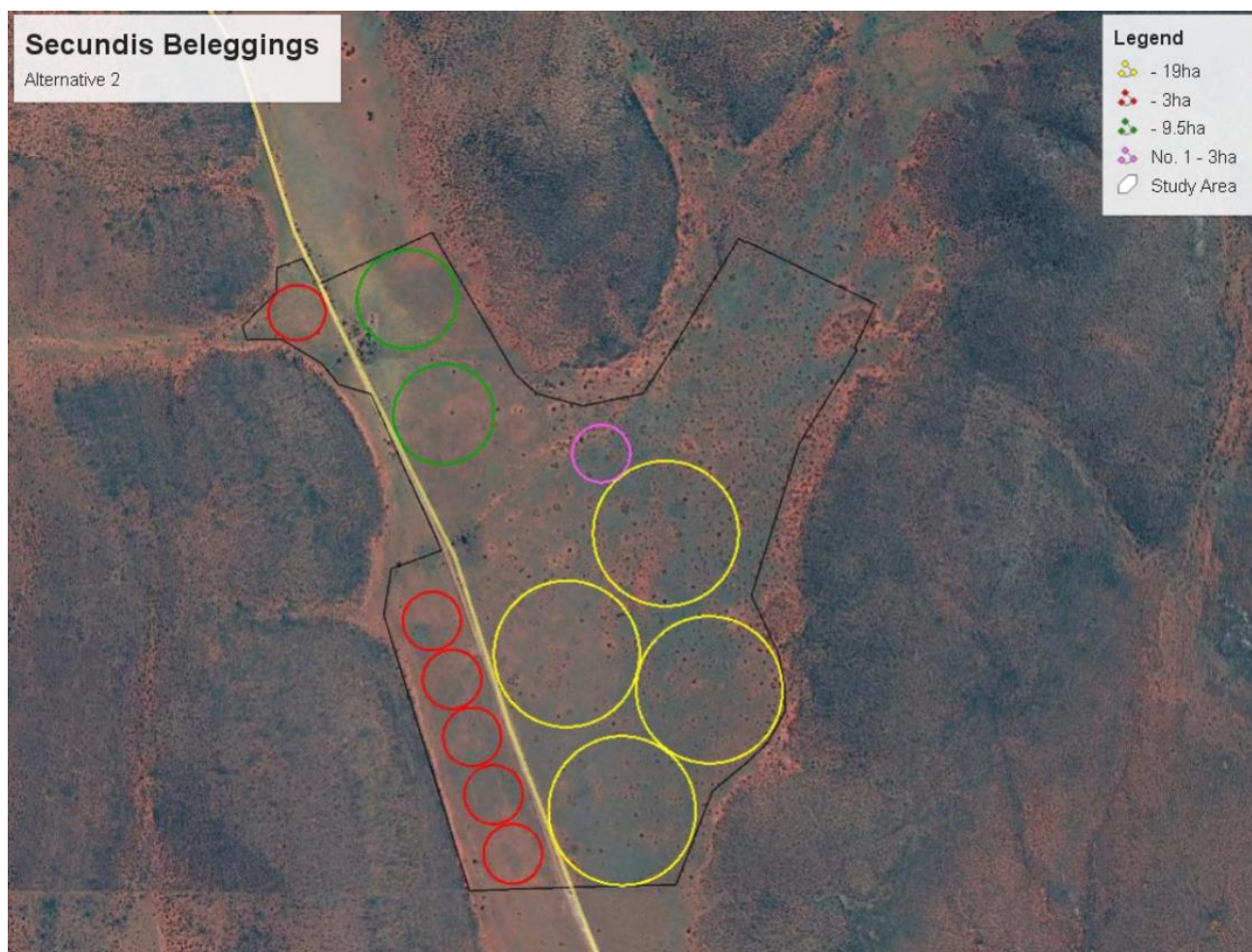


Figure 5: Secundis Beleggings Alternative 2

Seed potato farming is very labour intensive and numerous job opportunities will be created. Furthermore, seed potato farming has one of the highest value per cubic metre water (R50/m³) in comparison with wheat which is R5/m³).

Already established two track farm roads are already in place and will link up most of the pivots. In some cases, where tracks do not exist, some new two track farm road might be established.

A new water pipeline will be constructed and put in place to extract water from the already existing and approved / licensed 4 X boreholes. This will be used for the irrigation of all seed potato pivots as described in this report.

The project will entail two major aspects namely:

- The construction of a pipeline for irrigation from the existing boreholes.
- Cultivation of 135 ha seed potato pivots and some two track access roads.

4.2.1 Construction of a pipeline and water extraction point in the Riet River.

A new water pipeline will be constructed and put in place to extract water from the already existing and approved / licensed 4 X boreholes. This will be used for the irrigation of all seed potato pivots as described in this report.

Extraction Pump:

- The following extraction pumps will be erected at each of the already approved and licensed boreholes: 1 x 5.5kW, pump and 3 x 2.2kW pumps which will pump into a new 116 000 litre zinc dam. This borehole was drilled around 1975 and used to irrigate crops since. Water will be pumped by a centrifugal pump from the dam to the centre pivot.
- The power for the extraction pumps will be obtained from existing 100 KVA point.
- The extraction pumps will run for approximately 12 hours per day, pumping water to the amount of 95 m³ per hour (Monday to Saturday for a 3-month period).

Pipelines:

- A new 250 mm pipeline of approximately 0.8 km in length joining a 200mm pipeline of approximately 2.8km will be constructed to transport water from the zinc dam to the pivot areas. A narrow section of approximately 900mm will be cleared in order to accommodate the piping infrastructure. A trench of approximately 900 mm wide will be excavated in order to accommodate the subsurface burial of the pipeline.

On site Settling Dams:

As part of the above-mentioned pipeline and extraction pumps, the following settling dam and pumps will also be constructed on site:

- The existing boreholes will feed into an 8m zinc dam (50m² / 116m³). The co-ordinates of the dam: 28°43'53.75"S; 23°10'23.88"E. The dam level will be kept between 50% and 90% by a level sensor that automatically switches the borehole pumps on/off as required. The overflow of the dam will be directed into a natural existing drainage line.
- The dam will also be fitted with a 55 kW pump that will feed into the pipeline towards the centre pivots. Due to the long distance and high hill over which the pipeline will traverse, the pump will only deliver water at a rate of 95 m³/h and will run on average 12 hours per day (1140 m³) and will peak for about 3 weeks at 1900m³ per day. The growing season for early generation seed potatoes is from 10 January to 10 April with peak water requirements in March.

- At the dam site there will also be 2 x 5000L JoJo tanks for liquid fertilizer application through the irrigation system. These tanks will be mounted on a concrete foundation with a retainer wall (bund wall) surrounding the tanks to prevent environmental damage in case of spillages.

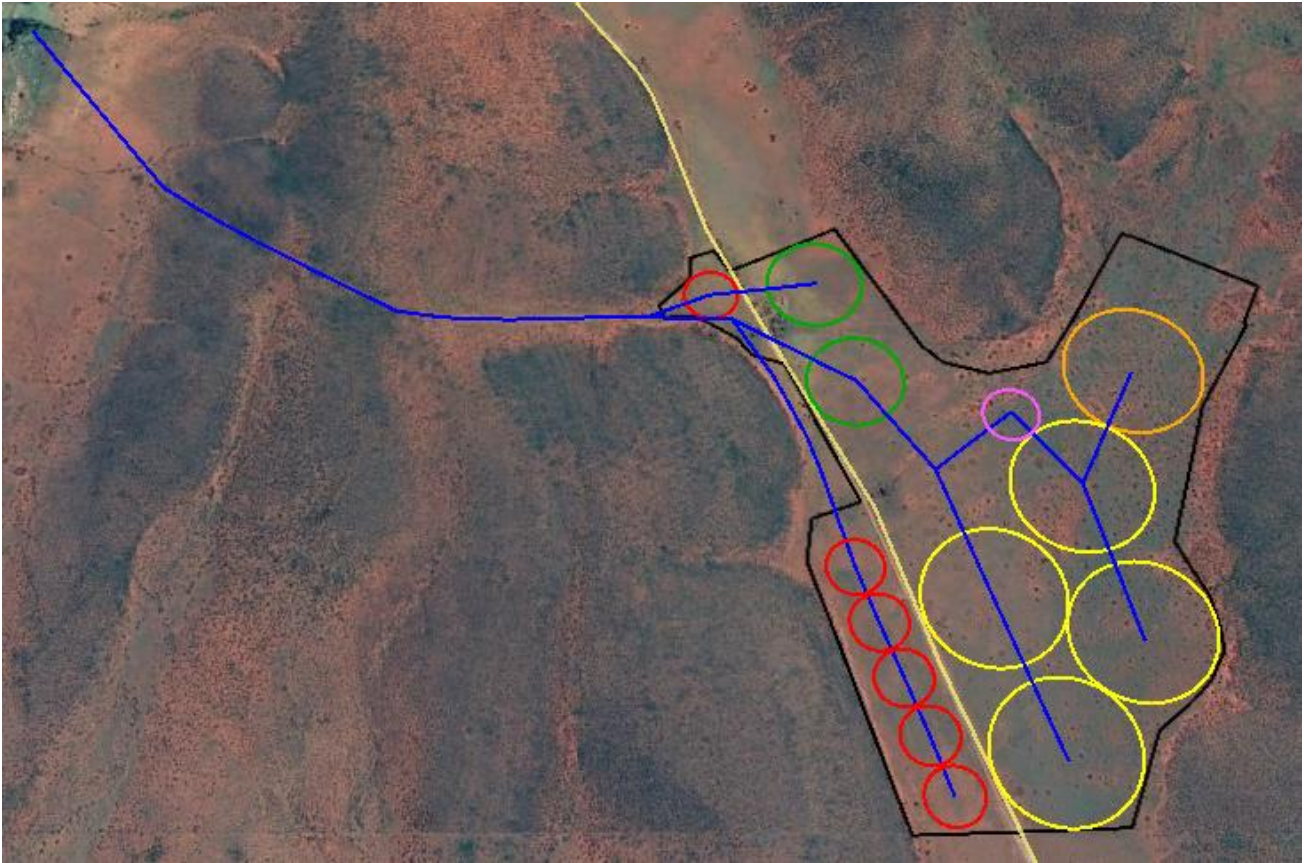


Figure 6: Proposed Pipeline Route

4.2.2 Cultivation of Seed potato pivots.

135 ha (Fourteen (14) pivot circles) will be established on the proposed project footprint with only 19ha being cultivated per season. The other circles are establishing to dryland pasture and left fallow for 7 years.

The cultivation and planting process will work as follows:

- The area will be cleared with the use of a Bulldozer and deep-ripped with the dozer tines to breakup and aerate the soils.
- Surface rocks will be manually removed from the area.
- Soil preparation will then be conducted by cultivation with the use of a chisel plough.
- Amelioration recommendations will be obtained from a soil scientist through chemical and organic soil analyses in order to ensure the appropriate nutrients/minerals, as required for the pivots, are incorporated into the growth medium (soil) prior to planting.

- A pivot irrigation system will be constructed and implemented over the entire proposed pivot area.
- Irrigation water will be abstracted from the existing and licensed four (4) boreholes as per the allotted water use license for the farm portion.
 - See Appendix G for the water use rights documentation indicating the allowable water use.
- Planting of seed potatoes will be conducted manually through manual labour.

4.2.3 Project Description Summary

The development will constitute a total footprint area of approximately 135 ha as indicated on the locality map. This will include the seed potato pivots along with certain internal two track gravel roads and associated infrastructure such as the pipeline and extraction pump

It has to be noted that the seed potato pivot preparation and planting/development phase will take approximately 8 years to be complete and will continue to follow an 8-year rotation cycle. In other words, not all pivots will be planted simultaneously. After each season, each pivot will be rehabilitated using buffalo grass and will remain dormant/inactive for a period of 7 years, before planting will again commence on the pivot. This cycle will continue.

If the operational phase is ever concluded in the future, the area will be suitable rehabilitated in order to return the project area to a self-sustainable ecological state.

4.3 PROJECT SERVICES

4.3.1 Electricity Supply

- The water extraction pump required during the operational phase at the existing boreholes is the only aspect requiring electricity. The electricity will be obtained from an existing 100kVa Eskom power point.

4.3.2 Sewage Management

- Sufficient portable chemical toilets will be supplied on site for the manual labourers during the construction phase. These toilets will be cleaned and waste removed by an appropriate contractor on a regular basis as and when required.
- Sufficient portable chemical toilets will also be supplied on site for the manual labourers during the short annual harvesting periods. These toilets will be cleaned and waste removed by an appropriate contractor on a regular basis as and when required.

4.3.3 Solid Waste Management

- Solid general waste generated on site will be removed by the applicant to the local municipal landfill site on a regular basis as and when required.
- It is envisaged that no significant hazardous waste will be generated on site during the construction or operational phases of the project. If any significant hazardous waste is however generated and suitable, registered waste contactor will be contracted to adequately remove and dispose of it.

4.3.4 Water Supply

As discussed under section 4.2.1 above, water will be extracted from the existing boreholes for irrigation purposes. See Appendix G for the water use documentation indicating the allowable water use.

5. NEEDS AND DESIRABILITY OF THE PROJECT

Various key factors must be taken into consideration as motivation/incentive for the potential benefits involved with the proposed project. These factors have been summarised below:

Seed potato production is one of the most valuable agricultural crops that can be grown in the Northern Cape. As long ago as 1948 Dr van der Plank, the world-renowned potato scientist and breeder, identified the area between Modder River and Douglas as one of the ideal seed production areas in South Africa. Since then the industry has established itself in the area with large investments in green houses, packing facilities and cold storage facilities. In terms of value per cubic meter of water, job creation, export earnings and sustainability it is one of the top three crops in the Northern Cape, including table grapes and pecan nuts. The one essential requirement for successful seed potato production is the space to implement a sustainable long term rotational system. Ideally this should be an eight-year rotation with the fallow fields being established to natural grasses occurring in the area. This is done by planting the grasses after the potatoes and irrigating the field until the grass is established. Thereafter it is rain fed. These fallow circles are then used for livestock production for the rest years. More detail is provided below.

5.1 COMPETITIVE ADVANTAGE:

There are only a few crops that have a strong competitive advantage in the irrigation areas around Kimberley. Seed potatoes is one of them.

The factors contributing to this competitive advantage are the following:

1. A low viral disease environment. The most important vector for viral diseases is plant aphids. The relative isolation, limited production of potatoes and other related species (e.g. tomatoes), the dry climate and the cold winters make the Northern Cape an ideal area.
2. A reliable supply of irrigation water.
3. Space to follow an eight-year rotational system with fallow lands only being used for grazing of livestock. This rotational system inhibits the buildup of bacterial and other diseases and also undesirable eelworm species. The seven years of animal grazing also helps restore some of the organic matter in the soil. This rotational system ensures long term sustainability in terms of viable potato seed production.
4. Suitable soils. The designated soils are particularly suited for potato production. These types of soil are not readily available close to reliable irrigation water resources.

The combination of the above factors makes this an excellent seed production area with definite advantages compared to other seed production areas in South Africa.

5.2 VALUE OF CROP:

South Africa is a water stressed country and it is therefore essential that we use our irrigation water effectively. Based on water use (m3 of water used per ton of food produced) potatoes are one of the most efficient. An example of the findings of a study in the USA is included in figure 7 below.

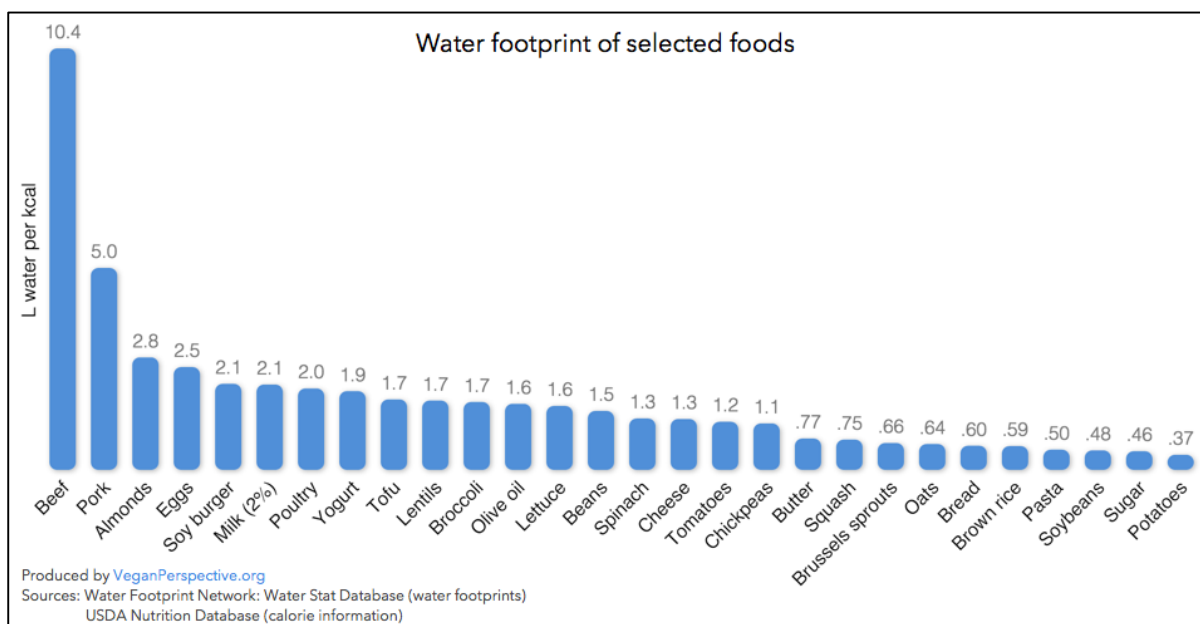


Figure 7: Water footprint of selected foods: USDA

The comparison of crops grown in the irrigation areas around Kimberley further support these findings. See Table 8.

Table 8: Crop yield in kg produce per cubic meter water used

Crop	Water requirements m3 per ha	Yield tons/ha	Yield in kg product per m3 water used
Seed Potatoes	5570	70	12.6
Onions	5300	65	12.3
Pecan Nuts	11000	2.5	0.2
Cotton	7534	5.5	0.7
Groundnuts	6900	4	0.6
Lucerne	11000	20	1.8
Maize	6900	15	2.2
Wheat	5700	8	1.4

These water use figures are from the Oranje Riet Water User’s Association and are based on long term usage.

It can be seen that with potatoes 12.6 kg produce is produced with 1 m3 of water compared to 1.4kg in the case of wheat. The yield per ha for potatoes also has the potential to be relatively higher than the yields of the

other crops with yields of over 100 tons per ha having been recorded in this area. That would take the yield per cubic meter up to 18 kg.

Table 9: Value of crops grown under irrigation

Crop	Water requirements m3 per ha	Yield tons/ha	Price of Product Rand/ton *	Gross Income per ha	Income per m3 of water
Seed Potatoes	5570	70	4370	305900	54.92
Onions	5300	65	3200	208000	39.25
Pecan Nuts	11000	2.5	80000	200000	18.18
Cotton	7534	5.5	9200	50600	6.72
Groundnuts	6900	4	12000	48000	6.96
Lucerne	11000	20	2100	42000	3.82
Maize	6900	15	2200	33000	4.78
Wheat	5700	8	4150	33200	5.82

* Price of product = Price of product with delivery at first point of transaction before transaction costs.
 **Price of potatoes is a weighted price of ware and seed in a 70:30 ratios.

As can be seen in Table 9 above, the value created by seed potato production far exceeds that of other crops grown in the Kimberley area both on an income per hectare basis and an income per cubic meter of water basis. Therefore, potato seed production should play a strategic role in the crop mix of the Northern Cape.

According to Potato South Africa, potatoes make up 8% of the staple diet of South Africans. It is affordable, nutritious and 100% locally grown. The Northern Cape area is the second biggest seed producing area for the industry and therefore plays a very strategic role. This role will probably increase with the water situation in the Western Cape where extensive ware and seed production takes place but where farmers are increasingly concentrating on their permanent fruit crops in the declining water availability situation.

5.3 JOB CREATION

Seed potato farming is capital and labour intensive. At present, it costs about R180 000 per ha to produce seed potatoes and this has a huge multiplier effect in the farming, labour and business community.

The jobs created involve skilled, semi-skilled and a labour component. Today most of the harvesting is done by mechanical harvesters so the labour component is mainly made up of labour in the packing shed and labour used for roguing which is the continual monitoring and removal of any off-types or diseased plants in the seed plantings. None of the work can be regarded as menial labour.

The skilled and semi-skilled staff component is made up of managers, admin staff, foremen, various machine operators and maintenance personnel.

The seasonal labour works from May until the end of September. About 9 to 10 months per year. The Applicant have used the same people for the last 20 years and have built up a solid relationship over the years.

The seasonal labour works from May until the end of September. About 9 to 10 months per year.

Table 10 shows the Cost of employment created by potato farming for another farm last year (2015/16)

Table 10: Employee costs 2016

	Total 2016	Potatoes 2016	Potatoes per ha
Seasonal labour (May to September)	R6,994,263	R4,420,442	R10,808
Permanent employees	R5,836,566	R2,743,186	R6,707
Management	R3,111,607	R1,462,455	R3,576
Total	R15,942,436	R8,626,083	R21,091

Actual figures from 2015/2016 management reports

The above figures exclude the cost and work opportunities for developing new lands.

5.4 DEVELOPMENT OF NEW LANDS

The above property is excellently suited for potato production as explained above. This unfortunately entails the breaking of new ground and the removal of indigenous trees.

It is our experience that the carrying capacity of the farm will actually increase with this system probably due to the combined effect of bush removal and residual fertilizer in the soil.

Secundis Beleggings understand the sensitivity around the removal of the natural veld and would like to cooperate with the necessary departments to make this a successful project with minimal impact on the environment, but the economic and social benefits of the project must be borne in mind. The fact is that the grazing potential of the veld is not reduced, but that an additional value through potato farming can be established on a long term sustainable basis.

This veld in its natural state can support about 100 breeding cows. This would create one job opportunity (at most) and an income of about R150 per ha. With the potato project, the income is increased to R27 000 per ha on the whole area plus the original R150 and about 200 job opportunities are created. We believe this deserves serious consideration.

6. ALTERNATIVES CONSIDERED

According to Chapter 1 of NEMA EIA Regulations of April 2017, Notice R326, “*Alternatives*”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to-

- (a) The **property** on which or **location** where it is proposed to undertake the activity;
- (b) The **type** of activity to be undertaken;
- (c) The **design** or **layout** of the activity;
- (d) The **technology** to be used in the activity;
- (e) The **operational** aspects of the activity; and
- (f) The option of **not implementing** the activity.

These NEMA EIA Regulations 2017, Notice R326, recognises that details on alternatives need to include “*a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity*”.

The consideration of alternatives is therefore a key component of an EIA process. While an EIA process should investigate and comparatively **consider** all alternatives that have been identified, only those found to be “feasible” and “reasonable” must be comparatively **assessed**, in terms of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the socio-economic aspects of communities that may be affected by the activity.

The “feasibility” and “reasonability” of an alternative are measured by:

- the general purpose and requirements of the activity;
- the need and desirability of the activity;
- opportunity costs;
- the need to avoid and/or minimise negative impacts;
- the need to maximise benefits; and
- how it impacts on the community that may be affected by the activity (DEA&DP, 2013b).

Alternatives considered for the proposed see potato pivots include two layout alternatives and a no-go option. The following section describes those alternatives that have been considered (i.e. identified and investigated) and indicate which alternatives are deemed to be “feasible” and “reasonable” and therefore preferred. It also indicates and compares the advantages and disadvantages of these alternatives.

6.1 LOCATION ALTERNATIVES

An alternative viable site location was not identified and evaluated for the project. The specific proposed location for said project is preferred as it is the only viable portion of land available in that vicinity which is up for procurement. The landowner and the applicant is the same person / company and therefore no Procurements arrangements had to be made. The portion is also situated directly adjacent to the homestead of the intending developer/project applicant which is on the farm portion from where water will be obtained for irrigation through extraction from boreholes. This will render the project viable from an economic and logistic perspective.

6.2 LAYOUT ALTERNATIVES

Two layout alternatives are however considered on the proposed project footprint and are summarised below:

Layout Alternative 1 (Preferred Alternative)

The preferred layout alternative includes the development of fourteen (14) seed potato pivots which will constitute 7 x approximate 3 ha cultivated pivot lands; 2 x approximate 9.5 ha cultivated pivot lands and 5 x approximate 19 ha cultivated pivot lands. This results in a total footprint area of approximately 135 ha in size. Six (6) of the 3 ha pivots are located towards the Eastern portion of the study area and is located east of the gravel road. The remaining pivots as per above description will all be located West of the gravel road.

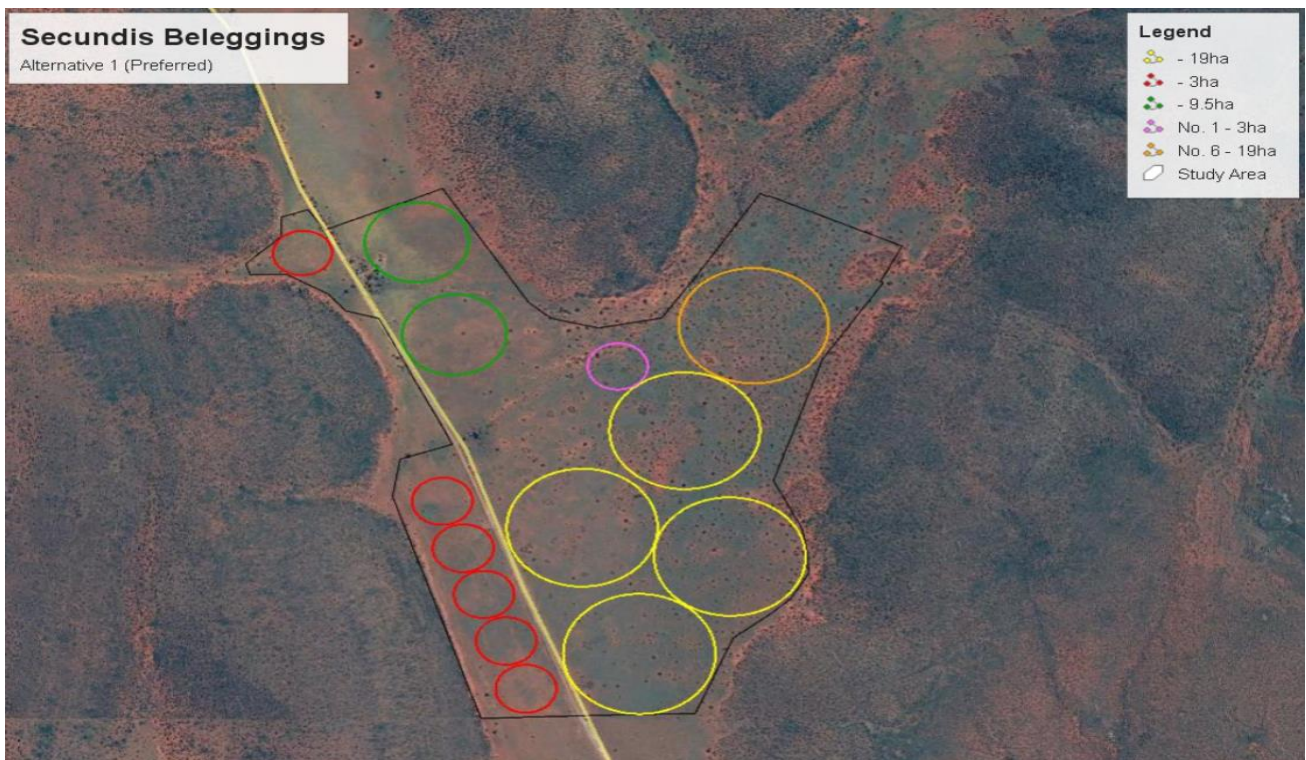


Figure 8: Secundis Beleggings Alternative 1 (Preferred Alternative)

Layout Alternative 2

Layout Alternative two includes the development of thirteen (13) seed potato pivots which will constitute 7 x approximate 3 ha cultivated pivot lands; 2 x approximate 9.5 ha cultivated pivot lands and 4 x approximate 19 ha cultivated pivot lands. This results in a total footprint area of approximately 116 ha in size. Six (6) of the 3 ha pivots are located towards the Eastern portion of the study area and is located east of the gravel road. The remaining pivots as per above description will all be located West of the gravel road. This alternative is the same as Alternative 1 (preferred) except for the exclusion of 1 x approximate 19 ha cultivated pivot land situated in the north-eastern corner of the assessment area.

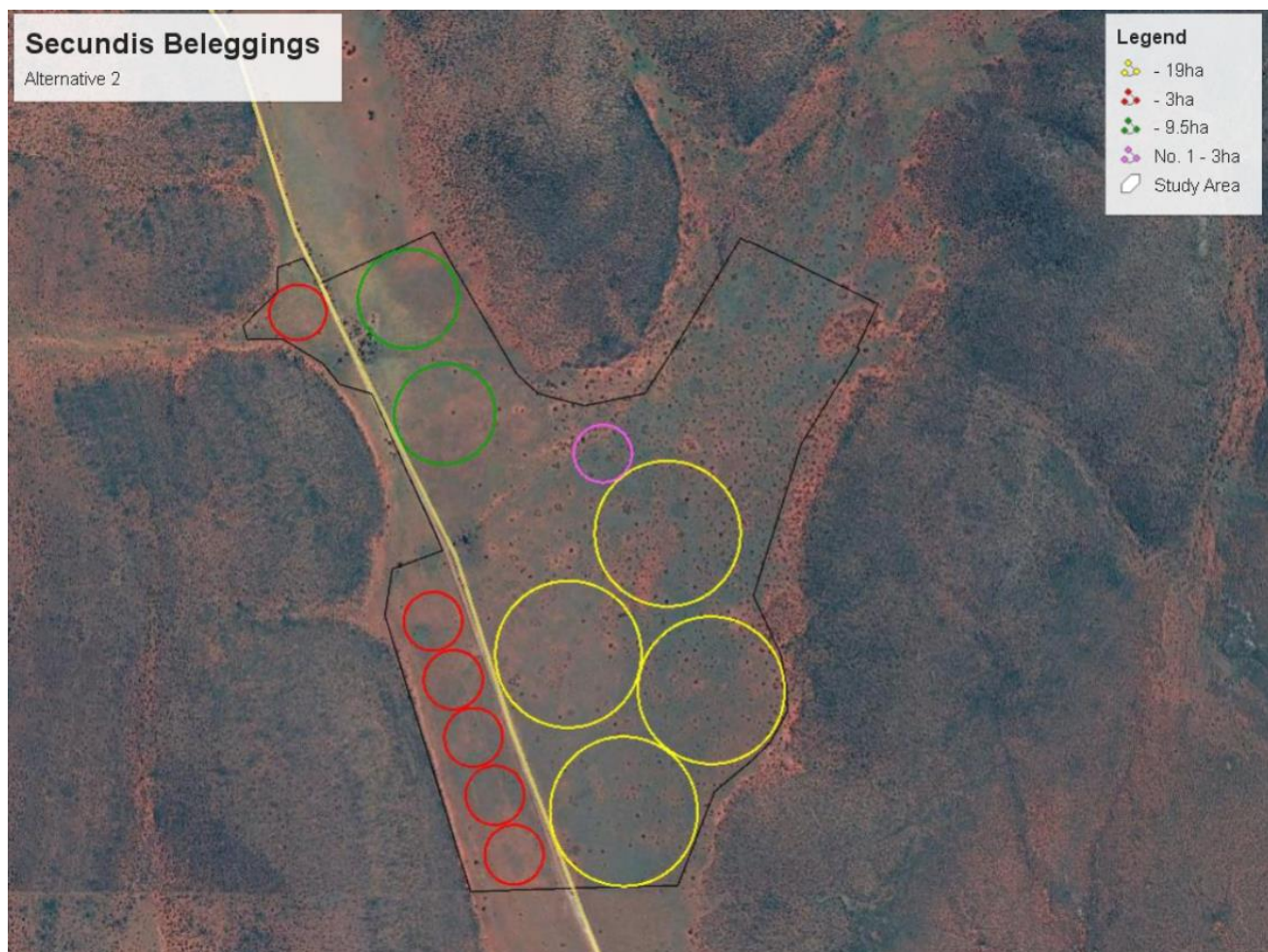


Figure 9: Secundis Beleggings Alternative 2

6.3 NO-GO OPTION

Advantages of not Developing

The negative environmental impacts associated with the proposed project and its alternatives as identified under Section 9 will be avoided if the proposed project is not implemented. If the proposed project not proceed, the socio-economic condition especially regarding job creation will be lost. This will result in nearly 300 job opportunities being lost. The low crazing capacity of the current land will be unchanged resulting in a further negative socio economic impact.

Disadvantages of not developing

If the proposed project however does not go ahead, the local communities will forego the economic benefits which the project will have on the area such as immediate additional employment opportunities and revenue streams and most importantly, sustainable capacity building (skills, experience and resources development) for the future. This will result in nearly 300 job opportunities being lost. The low crazing capacity of the current land will be unchanged resulting in a further negative socio economic impact.

7. DESCRIPTION OF THE ENVIRONMENT

The following section provides an overview of the bio-physical as well as the socio-economic environments of the proposed project. The table below (table 11) indicates the list of specialist studies that were conducted during the assessment process:

Table 11: List of Specialist Studies Conducted

Specialist Name	Organisation	Specialist Assessment Type
Mr. Rikus Lamprecht	EcoFokus Consulting	Ecological and Wetland Impact Assessment
Dr. Lloyd Rossouw	Palaeo Field Services	Archaeological and Palaeontological Impact Assessment (Heritage Assessment)
Dr. George van Zijl	Digital Soils Africa	Soil Suitability Assessment

7.1 BIO-PHYSICAL DESCRIPTION

This section provides a comprehensive description of the bio-physical environment of the proposed project area.

7.1.1 Climate

The rainfall of the region peaks during the summer months and the Mean Annual Precipitation (MAP) of the area is approximately 334 mm (www.climate-data.org). The maximum average monthly temperature is approximately 26.3°C in the summer months while the minimum average monthly temperature is approximately 9.8°C during the winter. Maximum daily temperatures can reach up to 34.7°C in the summer months and dip to as low as 1.5°C during the winter.

7.1.2 Geology and Soils

According to Mucina & Rutherford (2006) the geology of the landscape and associated vegetation type can be described as the following:

The flat to slightly undulating plains are characterised by Andesitic lavas of the Allanridge formation in the northern and western sections of the vegetation type. Deep sandy to loamy soils of the Hutton soil form are mainly present.

The scattered hills within the plains are associated with highly fragmented, extensive dolerite sills which form ridges, plateaus and slopes of the koppies. Rock and boulder covered slopes mainly constitute stony Mispah and gravel-rich Glenrosa soil types.

7.1.3 Topography

The proposed project area is mainly characterised by a wide, flat open plain consisting of deep sandy to loamy soils of the Hutton soil form. A slightly elevated rocky ridge area with well drained soils is also present in the southern section of the proposed project area. The topography of the area varies between 1036 to 1074 MASL.

7.1.4 Ecological and Vegetation Conservation Status

An Ecological and Wetland Impact Assessment was conducted for the proposed project area in order to determine the ecological value/significance and subsequent conservational importance and sensitivity of the area. The potential impacts that the proposed project will have on the ecology of the area were identified and evaluated to determine possible mitigation measures which could be implemented in order to acceptably reduce the significance of the associated impacts. Please see appendix E1 for the full Ecological Specialist Study. The section below describes the General Vegetation and Conservation status.

According to Mucina & Rutherford (2006), the entire assessment area forms part of the Olifantshoek Plains Thornveld vegetation type (SVk 13) which mainly consists of wide plains with an open tree and shrubland layer and usually a sparse grass layer. This vegetation type is merely classified as least threatened because of its broad distribution (Mucina & Rutherford, 2006). The adjacently situated elevated hill complexes, which will

be traversed by the proposed irrigation pipeline, form part of the Kuruman Mountain Bushveld vegetation type (SVk 10) which is also merely classified as least threatened as very little has been transformed thus far (Mucina & Rutherford, 2006).

The entire assessment area is merely classified as 'other natural land' while the elevated hill complex situated to the east falls within an Ecological Support Area (ESA) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan. ESA's are areas that play an important role in supporting the ecological functioning of a protected area or Critical Biodiversity Area (CBA), or in delivering ecosystem services (Collins, 2015). In most cases ESAs are currently in at least fair ecological condition, and should remain in at least fair ecological condition. CBA's are areas which play an important role in conservation and reaching certain minimum required provincial biodiversity targets for ecosystem types, species or ecological processes (Collins, 2015).

The proposed cultivated pivot land developments will in all probability completely transform the existing surface vegetation on their 135 ha or 116 ha total footprint areas depending on the final footprint alternative which is eventually decided upon. The irrigation pipelines will only transform a narrow linear section of approximately 900 mm along their lengths.

See vegetation and sensitivity maps below.

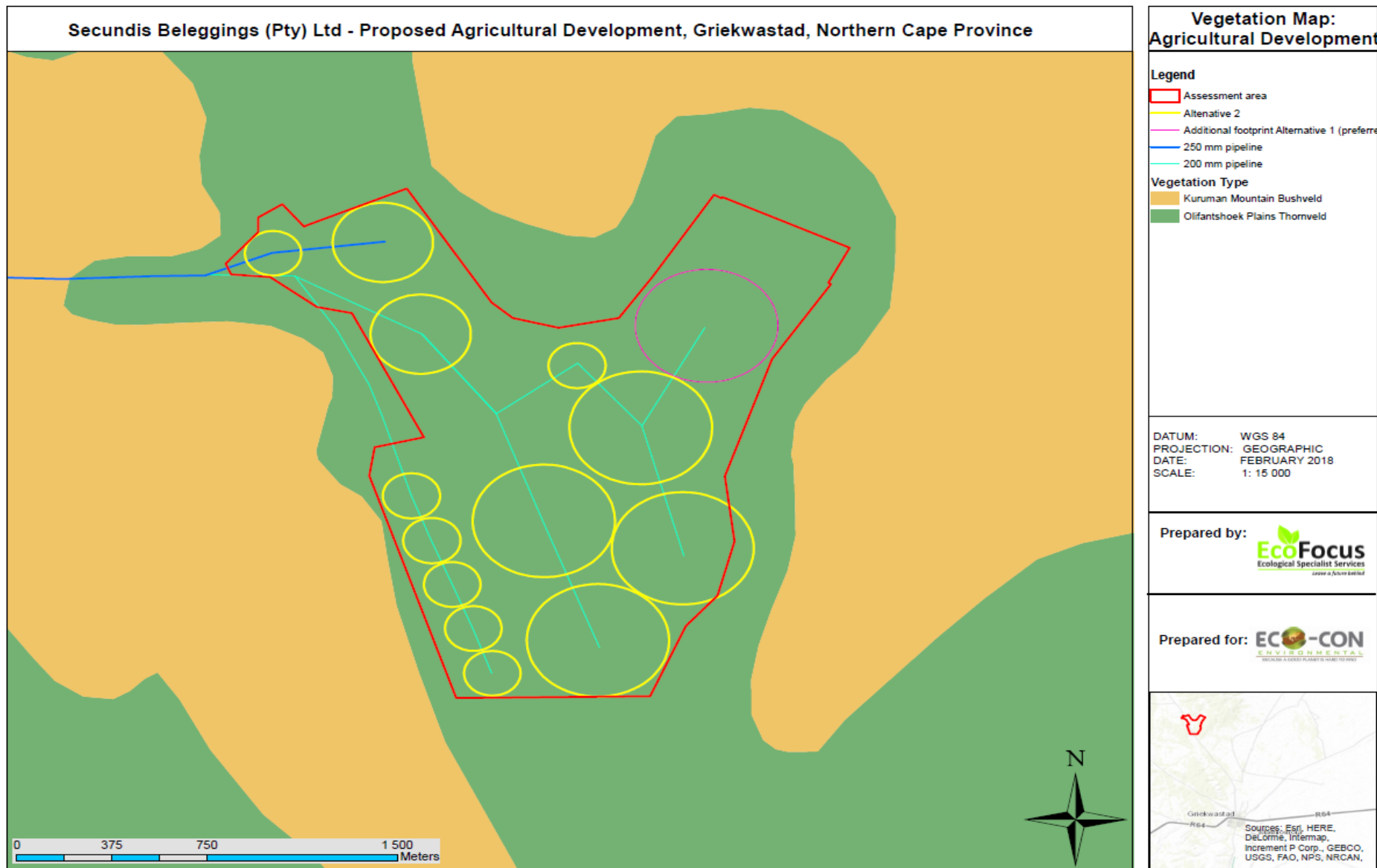


Figure 10: Vegetation map of the proposed project layout (see Appendix B for an A3 size version)

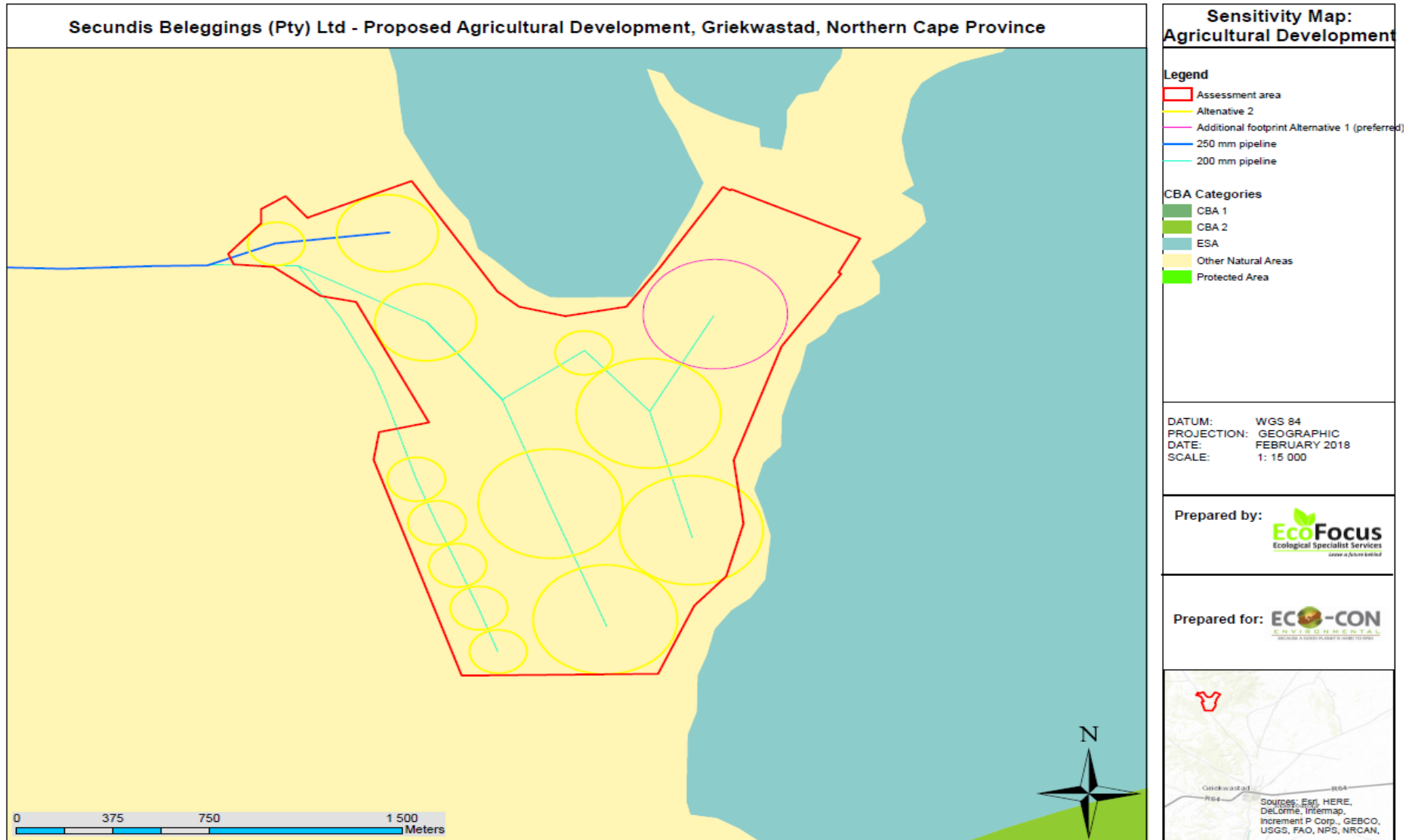


Figure 11: Ecological sensitivity map of the proposed project layout (see Appendix B for an A3 size version)

7.1.4.1 Terrestrial environment

Results and Discussion of the Specialist Report

The proposed project area can roughly be divided into two sections based on landscape structure and condition of vegetation/extent of degradation:

- Western Section (West of the Gravel Road)
- Eastern Section (East of the Gravel Road)

Each of the sections will now be discussed:

Western Section (West of the Gravel Road)

Current Existing Vegetation and Site Condition

The most northern portion of this western section of the assessment area is associated with a single proposed approximate 3 ha cultivated pivot land. The proposed cultivated pivot land footprint as well as surrounding landscape consists of a relatively natural, open flat medium height grassland. The footslope of a large elevated hill complex commences approximately 10 m to the north-west and south-west of the proposed cultivated pivot land footprint respectively. A woody component is virtually completely absent from the footprint with the exception of sporadic shrub individuals closer to the footslope of the hill complex. The density of the woody component outside of the proposed footprint abruptly increases from the footslope and along the sideslope of the hill complex. The hill complex forms part of an ESA and is utilised by various larger antelope species such as Kudu as well as other mammal and bird species as refuge and for breeding/persistence purposes. It is therefore recommended that a sufficient corridor must be buffered out around the footslope of the hill complex if practicably possible in order to ensure continued ecological connectivity and functionality of the adjacent ESA and to allow for movement of fauna and flora through the broader area.

Sporadic woody individuals within the proposed footprint closer to the footslope of the hill complex mainly constitute low to medium height shrubs of the species *Senegalia mellifera* & *Tarchonanthus camphoratus* which are both considered problematic bush encroachment species in the Northern Cape Province. Other woody shrubs species also found to be present but rather associated with the commencement of the footslope as opposed to the flat footprint of the proposed cultivated pivot land include *Ziziphus mucronata*, *Vachellia karroo* & *Lebeckia macrantha*.

The lower shrub and forb layer is mainly dominated by the species *Euryops subcarnosus*, *Hertia pallens* & *Crotalaria orientalis*. Other species also found to be present include *Salsola aphylla*, *Osteospermum leptolobum*, *Pteronia sp.*, *Acrotome inflata*, *Hermannia comosa*, *Lycium horridum*, *Wahlenbergia nodosa*,

Senna italica subsp arachoides, *Lebeckia spinescens*, *Hermannia tomentosa*, & a confined patch of *Elephantorrhiza elephantina*.

The medium height grass layer is mainly dominated by the species *Aristida congesta*, *Stipagrostis uniplumis* & *Schmidtia pappophoroides* while other species also found to be present include *Eragrostis lehmanniana*, *Pogonarthria squarrosa* & *Cymbopogon pospischilii*



Figure 12: Image illustrating the landscape of the proposed northern portion of the western section of the assessment area with the hill complex in the background

The most southern portion of this western section of the assessment area is associated with five proposed approximate 3 ha cultivated pivot lands and an associated 200 mm irrigation pipeline. The proposed cultivated pivot land footprints as well as surrounding landscape consist of a relatively natural, open flat medium height grassland with a similar species composition to that of the northern portion. A very sparse woody component is present which mainly constitutes low woody shrubs (≤ 2 m) of the nationally protected tree species *Vachellia haematoxylon* sporadically scattered throughout the area. A total of approximately 36 shrub individuals of this species are present within the proposed five footprint areas which will need to be removed. The fact that their sizes and growth forms are mainly restricted to low shrubs (≤ 2 m) indicates the potential impact of historic farm management practices which may have induced a degree of bush encroachment of this species, rather than natural representation/distribution. This assumption therefore detracts somewhat from their significance as nationally protected species on this specific site.

A confined area within the first proposed cultivated pivot land footprint from the north has been significantly degraded due to the presence of a drinking water point for livestock. Livestock usually tend to concentrate their grazing and resting activities in the vicinity of such drinking water points to enable quick access when required. The grass layer of this portion has been severely overgrazed which has had a surface creeping and grass 'carpet' forming effect. Virtually no grass tufting is present. A small number of individuals of the legally declared invasive species *Prosopis sp.* (Category 3) are present.

A single isolated clump of two medium sized tree individuals of the nationally protected tree species *Vachellia erioloba* were found to be present within this southern portion of the western section. They however fall closer to the footslope of the hill complex and therefore outside the proposed five footprint areas and it is therefore once again recommended that a sufficient corridor must be buffered out around the footslope of the hill complex if practicably possible to keep these trees in situ and in order to ensure continued ecological connectivity and functionality of the adjacent ESA and to allow for movement of fauna and flora through the broader area.

No Red Data Listed-, or any other species of conservational significance were found to be present within the proposed cultivated pivot land footprints of the western section of the assessment area.



Figure 13: Image illustrating the landscape of the proposed southern section of the western section of the assessment area with the hill complex in the background

The open grassland of the western section of the assessment area is utilised by various smaller antelope species such as Steenbok (*Raphicerus campestris*), burrowing mammals as well as numerous reptiles such as

lizards, snakes & tortoises for foraging/persistence habitat but the mobility of such animals along with the vast, continuous, undeveloped surrounding natural landscape allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas. The assessment area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (www.birdlife.org.za/conservation/important_bird_areas/iba-map). No important bird species, unique or specialised bird habitats were observed either

Table 12: Species list for the proposed cultivated pivot land footprint areas associated with the western section of the assessment area (Nationally protected species highlighted in orange and legally declared invasive species in red)

Species name		
Graminoids	Forbs and small shrubs	Shrubs & trees
<i>Aristida congesta</i>	<i>Acrotome inflata</i>	<i>Lebeckia macrantha</i>
<i>Cymbopogon pospischilii</i>	<i>Crotolaria orientalis</i>	<i>Prosopis sp.</i>
<i>Eragrostis lehmanniana</i>	<i>Elephantorrhiza elephantina</i>	<i>Senegalia mellifera</i>
<i>Pogonarthria squarrosa</i>	<i>Euryops subcarnosus</i>	<i>Tarchonanthus camphoratus</i>
<i>Schmidtia pappophoroides</i>	<i>Hermannia comosa</i>	<i>Vachellia erioloba</i>
<i>Stipagrostis uniplumis</i>	<i>Hermannia tomentosa</i>	<i>Vachellia haematoxylon</i>
-	<i>Hertia pallens</i>	<i>Vachellia karroo</i>
-	<i>Lebeckia spinescens</i>	<i>Ziziphus mucronata</i>
-	<i>Lycium horridum</i>	-
-	<i>Osteospermum leptolobum</i>	-
-	<i>Pteronia sp.</i>	-
-	<i>Salsola aphylla</i>	-
-	<i>Senna italica subsp arachoides</i>	-
-	<i>Wahlenbergia nodosa</i>	-

Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of the western section of the assessment area is classified as Class B as it is largely natural. A change in natural habitats and biota has taken place in a confined area within one of the proposed cultivated pivot land footprints due to significant degradation caused by concentrated cattle grazing and resting activities but the ecosystem functionality of the larger area has remained essentially unchanged.

The Olifantshoek Plains Thornveld vegetation type (SVk 13), within which the assessment area is situated, is merely classified as least threatened by Mucina & Rutherford (2006) and the footprints of the western section of the assessment area are small relative to the surrounding natural landscape associated with the vegetation type which is vast and relatively homogenous. The entire assessment area is also merely classified as 'other natural land' in accordance with the Northern Cape Provincial Spatial Biodiversity Plan.

A total of approximately 36 shrub individuals of the nationally protected tree species *Vachellia haematoxylon* are present within the proposed five footprint areas which will need to be removed. The fact that their sizes and growth forms are mainly restricted to low shrubs (≤ 2 m) indicates the potential impact of historic farm management practices which may have induced a degree of bush encroachment of this species, rather than natural representation/distribution. This assumption therefore detracts somewhat from their significance as nationally protected species on this specific site. Only a single isolated clump of two medium sized tree individuals of the nationally protected tree species *Vachellia erioloba* were found to be present within this southern portion of the western section. They however fall closer to the footslope of the hill complex and outside the proposed five footprint areas and will be left in situ. No Red Data Listed-, or any other species of conservational significance were found to be present within the proposed cultivated pivot land footprints of the western section of the assessment area.

The mobility of smaller antelope species, burrowing mammals as well as reptiles, along with the vast, continuous surrounding natural landscape allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas. The assessment area also does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (www.birdlife.org.za/conservation/important_bird_areas/iba-map). No important bird species, unique or specialised bird habitats were observed either.

The Ecological Importance and Sensitivity (EIS) of the western section of the assessment area is therefore merely classified as Class C (moderate) as it could be viewed as ecologically important and sensitive on local scale mainly due to the sparse presence of nationally protected tree species. Biodiversity is however still relatively ubiquitous within the broader area. The western section of the assessment area is therefore not necessarily viewed as being of high conservational significance for habitat preservation or ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type or protected tree species.

Eastern Section (East of the Gravel Road)

Current Existing Vegetation and Site Condition

The most northern portion of this eastern section of the assessment area is associated with two proposed approximate 9.5 ha cultivated pivot lands and 200 mm irrigation pipelines. The proposed cultivated pivot land footprints as well as surrounding landscape consists of a relatively natural, open flat medium height grassland. A well represented woody component is present but mainly constitutes low woody shrubs (≤ 2 m) with small to medium sized trees being sparsely scattered throughout the area. The footslope of a large elevated hill complex commences approximately 40 m to the east of the proposed cultivated pivot land footprints and the density and height of the woody component outside of the proposed footprints gradually increases towards the hill complex. The hill complex forms part of an ESA and is utilised by various larger antelope species such as Kudu as well as other mammal and bird species as refuge and for breeding/persistence purposes. It is therefore recommended that a sufficient corridor must be buffered out around the footslope of the hill complex if practicably possible in order to ensure continued ecological connectivity and functionality of the adjacent ESA and to allow for movement of fauna and flora through the broader area.

A confined area directly adjacent to the dirt road has been significantly degraded due to the presence of a drinking water point for livestock. The grass layer of this portion has been severely overgrazed which has had a surface creeping and grass 'carpet' forming effect. Virtually no grass tufting is present. The area mainly constitutes a relatively dense stand of *Vachellia karroo* and the legally declared invasive species *Prosopis sp.* (Category 3) with few *Ziziphus mucronata* individuals also being present. Only a small portion of this degraded area however falls inside the most northerly situated proposed cultivated pivot land footprint.

The low woody shrub layer of the remaining majority of the northern footprint areas is dominated by the nationally protected tree species *Vachellia haematoxylon*. A total of approximately 132 shrub individuals of this species are present within the most northerly situated proposed cultivated pivot land footprint which will need to be removed. The average density of these shrubs within the second approximate 9.5 ha cultivated pivot land footprint area amounts to approximately 20 shrubs/ha which equates to a total estimate of approximately 190 shrubs within this footprint which will need to be removed. Their density and the fact that their sizes and growth forms are mainly restricted to low shrubs (≤ 2 m) indicates the potential impact of historic farm management practices which may have induced a degree of bush encroachment of this species, rather than natural representation/distribution. This assumption therefore detracts somewhat from their significance as nationally protected species on this specific site. Medium sized tree individuals of this species are also sparsely scattered throughout the area. Only one tree individual of significant size of this species was

found to be present within the northern portion of the eastern section of the assessment area but it falls outside the proposed footprints areas. This tree must be left in situ.

Other tree and shrub species also found to be sporadically present within the northern portion of the eastern section of the assessment area include *Searsia burchellii* & *Tarchonanthus camphoratus*.

The lower shrub and forb layer is mainly dominated by the species *Euryops subcarnosus*, *Hertia pallens*, *Pterothrix spinescens* & *Crotolaria orientalis*. Other species also found to be present include *Salsola aphylla*, *Osteospermum leptolobum*, *Pteronia sp.*, *Hermannia comosa*, *Lycium horridum*, *Wahlenbergia nodosa*, *Senna italica subsp arachoides*, *Lebeckia spinescens*, *Hermannia tomentosa*, *Barleria rigida*, *Dicoma schinzii*, *Indigofera dalaeoides*, *Pollichia campestris*, *Acrotome inflata* & *Elephantorrhiza elephantina*. A single individual of the species *Boophane disticha* (provincially protected and formerly Red Data Listed) was found to be present within the most northerly situated proposed cultivated pivot land footprint. It is recommended that this individual be removed prior to the commencement of the construction phase and adequately relocated to a suitable, similar open area.

The medium height grass layer is mainly dominated by the species *Aristida congesta*, *Stipagrostis uniplumis* & *Schmidtia pappophoroides* while other species also found to be present include *Eragrostis lehmanniana*, *Pogonarthria squarrosa* & *Cymbopogon pospischilii*.

A small seasonal drainage line traverses the northern portion of the eastern section of the assessment area but it dissipates into the confined degraded area directly adjacent to the dirt road. This seasonal drainage line does not fall within any of the proposed cultivated pivot land footprints and should therefore not be adversely affected by the proposed development



Figure 14: Image illustrating the landscape of the proposed northern portion of the eastern section of the assessment with the hill complex in the background

The two approximate 19 ha proposed cultivated pivot land footprints and 200 mm irrigation pipeline situated directly adjacent the dirt road in the southern portion of the eastern section of the assessment area have a similar species composition and structure to that of the northern footprints. The average density of the nationally protected shrub species *Vachellia haematoxylon* is however slightly higher and amounts to approximately 30 shrubs/ha which equates to a total estimate of approximately 540 shrubs within these two footprints which will need to be removed. Five tree individuals of significant size of this species were found to be present within the southern portion of the eastern section of the assessment area of which four will need to be removed that fall inside the proposed cultivated pivot land footprints. The fifth individual falls outside the proposed footprints areas. This tree must be left in situ.

A single isolated clump of five medium sized tree individuals of the nationally protected tree species *Vachellia erioloba* were found to be present within this southern portion of the eastern section. They however fall on the edge of the most southerly located footprint and it is therefore recommended that they be left in situ if practically possible.

Within the remaining portion of the eastern section of the assessment area, the open grassland is replaced by a relatively dense savannah with a significantly increased woody density and diversity. This portion is associated with three approximate 19 ha proposed cultivated pivot lands, one of which is only associated with Alternative 1 (preferred), and a single approximate 3 ha footprint as

well as 200 mm irrigation pipelines. The reason for the significant increase in woody density and diversity is the closer proximity to the woody hill complex. The complete dominance of the woody shrub *Vachellia haematoxylon* is replaced by a more representative mixture of low to medium height trees and shrubs of the species *Vachellia haematoxylon*, *Searsia tridactyla*, *S burchellii*, *Tarchonanthus camphoratus*, *Lebeckia macrantha*, *Senegalia mellifera*, *Ziziphus mucronata*, *Ehretia rigida* & *Grewia flava*. The average density of *Vachellia haematoxylon* still amounts to approximately 30/ha which equates to a total estimate of approximately 1800 individuals within these four footprints which will need to be removed. Only one tree individual of significant size of this species was found to be present within the approximate 3 ha footprint of the eastern section of the assessment area which will need to be removed.

Two isolated clumps of two and five medium sized tree individuals respectively of the nationally protected tree species *Vachellia erioloba* were found to be present within two of the approximate 19 ha footprints of the eastern section. They will have to be removed.

A single individual of the nationally protected tree species *Boscia albitrunca* was found to be present on the edge of the additional footprint associated with Alternative 1 (preferred) which must be left in situ. The density of the woody component within this additional footprint associated with Alternative 1 (preferred) however

made access and sufficient observation of other potential individuals difficult. It is therefore recommended that an additional ecological walkthrough of this footprint be conducted prior to commencement of the construction phase in order to identify potential additional individuals.

With the exception of the single individual of the provincially protected species *Boophone disticha*, no Red Data Listed-, or any other species of conservational significance were found to be present within the proposed cultivated pivot land footprints of the eastern section of the assessment area.



Figure 15: Image illustrating the relative dense woody landscape of the remaining portion of the eastern section of the assessment area

As with the western section, the open grassland of the eastern section of the assessment area is utilised by various smaller antelope species such as Steenbok (*Raphicerus campestris*), burrowing mammals as well as numerous reptiles such as lizards, snakes & tortoises for foraging/persistence habitat but the mobility of such animals along with the vast, continuous, undeveloped surrounding natural landscape allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas. The assessment area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website ([www.birdlife.org.za/conservation/important bird areas/iba-map](http://www.birdlife.org.za/conservation/important%20bird%20areas/iba-map)). No important bird species, unique or specialised bird habitats were observed either.

The denser woody areas of the eastern section of the assessment area (as discussed above) along with the hill complex are however utilised by various larger antelope species such as Kudu as well as other mammal and bird species as refuge and for breeding/persistence purposes. Although a portion of these denser woody areas

will be transformed by the proposed development, the hill complex and ESA will remain intact and should provide sufficient remaining persistence habitat. It is recommended that a sufficient corridor must be buffered out around the footslope of the hill complex if practicably possible in order to ensure continued ecological connectivity and functionality of the adjacent ESA and to allow for movement of fauna and flora through the broader area.

Table 13: Species list for the proposed cultivated pivot land footprint areas associated with the eastern section of the assessment area (Nationally protected species highlighted in orange and legally declared invasive species in red)

Species name		
Graminoids	Forbs and small shrubs	Shrubs & trees
<i>Aristida congesta</i>	<i>Acrotome inflata</i>	<i>Boscia albitrunca</i>
<i>Cymbopogon pospischilii</i>	<i>Barleria rigida</i>	<i>Ehretia rigida</i>
<i>Eragrostis lehmanniana</i>	<i>Boophone disticha</i>	<i>Grewia flava</i>
<i>Pogonarthria squarrosa</i>	<i>Crotolaria orientalis</i>	<i>Lebeckia macrantha</i>
<i>Schmidtia pappophoroides</i>	<i>Dicoma schinzii</i>	<i>Prosopis sp.</i>
<i>Stipagrostis uniplumis</i>	<i>Elephantorrhiza elephantina</i>	<i>Searsia burchellii</i>
-	<i>Euryops subcarnosus</i>	<i>Searsia tridactyla</i>
-	<i>Hermannia comosa</i>	<i>Senegalia mellifera</i>
-	<i>Hermannia tomentosa</i>	<i>Tarchonanthus camphoratus</i>
-	<i>Hertia pallens</i>	<i>Vachellia erioloba</i>
-	<i>Indigofera dalaeoides</i>	<i>Vachellia haematoxylon</i>
-	<i>Lebeckia spinescens</i>	<i>Vachellia karroo</i>
-	<i>Lycium horridum</i>	<i>Ziziphus mucronata</i>
-	<i>Osteospermum leptolobum</i>	-
-	<i>Pollichia campestris</i>	-
-	<i>Pteronia sp.</i>	-
-	<i>Pterothrix spinescens</i>	-
-	<i>Salsola aphylla</i>	-
-	<i>Senna italica subsp arachoides</i>	-
-	<i>Wahlenbergia nodosa</i>	-

Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of the eastern section of the assessment area is classified as Class B as it is largely natural. A change in natural habitats and biota has taken place in two confined areas due to significant degradation caused by concentrated cattle grazing and resting activities but the ecosystem functionality of the larger area has remained essentially unchanged.

The Olifantshoek Plains Thornveld vegetation type (SVk 13), within which the assessment area is situated, is merely classified as least threatened by Mucina & Rutherford (2006). The eastern section footprints of the assessment area are moderately sized relative to the surrounding natural landscape associated with the vegetation type which is vast and relatively homogenous. The entire assessment area is also merely classified as 'other natural land' in accordance with the Northern Cape Provincial Spatial Biodiversity Plan.

A total of approximately 2662 shrub and tree individuals of the nationally protected tree species *Vachellia haematoxylon* are present within the proposed footprint areas which will need to be removed. The fact that their sizes and growth forms in the grassland are mainly restricted to low shrubs (≤ 2 m) indicates the potential impact of historic farm management practices which may have induced a degree of bush encroachment of this species, rather than natural representation/distribution. This assumption therefore detracts somewhat from their significance as nationally protected species on this specific site. The tree and shrub individuals of this species within the denser woody portions are however of more conservational significance as they form part of the dense savannah in closer proximity to the woody hill complex and ESA. A single isolated clump of five medium sized tree individuals of the nationally protected tree species *Vachellia erioloba* were found to be present within the southern portion of the eastern section. They however fall on the edge of the most southerly located footprint and it is therefore recommended that they be left in situ if practically possible. Two other isolated clumps of two and five medium sized tree individuals respectively of this species were also found to be present within two of the approximate 19 ha footprints of the eastern section. They will have to be removed. A single individual of the nationally protected tree species *Boscia albitrunca* was found to be present on the edge of the additional footprint associated with Alternative 1 (preferred) which must be left in situ. With the exception of the single individual of the provincially protected species *Boophone disticha*, no Red Data Listed-, or any other species of conservational significance were found to be present within the proposed cultivated pivot land footprints of the eastern section of the assessment area.

The mobility of smaller antelope species, burrowing mammals as well as reptiles, along with the vast, continuous surrounding natural landscape allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas. The assessment area also does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website

(www.birdlife.org.za/conservation/important_bird_areas/iba-map). No important bird species, unique or specialised bird habitats were observed either. The denser woody areas of the eastern section of the assessment area along with the hill complex are however utilised by various larger antelope species such as Kudu as well as other mammal and bird species as refuge and for breeding/persistence purposes. Although a portion of these denser woody areas will be transformed by the proposed development, the hill complex and ESA will remain intact and should provide sufficient remaining ecological connectivity and functionality. It is recommended that a sufficient corridor must be buffered out around the footslope of the hill complex if practicably possible in order to ensure continued ecological connectivity and functionality of the adjacent ESA and to allow for movement of fauna and flora through the broader area.

The Ecological Importance and Sensitivity (EIS) of the eastern section of the assessment area is therefore classified as Class C (moderate) as it could be viewed as ecologically important and sensitive on provincial scale mainly due to the significant presence of nationally protected tree species within the denser woody areas. Biodiversity is however still relatively ubiquitous within the broader area. The denser woody areas within the eastern section of the assessment area are however viewed as being of moderate conservational significance for habitat preservation or ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA and protected tree species

7.1.4.2 Conclusions and Recommendations

The proposed cultivated pivot land developments will in all probability completely transform the existing surface vegetation on their 135 ha or 116 ha total footprint areas depending on the final footprint alternative which is eventually decided upon. The irrigation pipelines will only transform a narrow linear section of approximately 900 mm along their lengths. Although the proposed cultivated pivot land footprints scored a relatively high PES value, the Olifantshoek Plains Thornveld vegetation type (SVk 13) associated with the assessment area is merely classified as least threatened and the footprints are moderately sized relative to the surrounding natural landscape which is vast and relatively homogenous. The entire assessment area is also merely classified as 'other natural land' in accordance with the Northern Cape Provincial Spatial Biodiversity Plan and merely scored a moderate EIS value. The area is therefore not necessarily viewed as being of high conservational significance for habitat preservation or ecological functionality persistence in support of the surrounding ecosystem or broader vegetation type. Denser woody areas are however present within the eastern section of the assessment area associated with the additional footprint of Alternative 1 (preferred). These areas are viewed as being of moderate conservational significance for habitat preservation or ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and nationally protected tree species which are present.

A total of approximately 2662 shrub and tree individuals of the nationally protected tree species *Vachellia haematoxylon* are present within the proposed footprint areas which will need to be removed. The fact that their sizes and growth forms in the open grassland are mainly restricted to low shrubs (≤ 2 m) indicates the potential impact of historic farm management practices which may have induced a degree of bush encroachment of this species, rather than natural representation/distribution. This assumption therefore detracts somewhat from their significance as nationally protected species on this specific site. The tree and shrub individuals of this species within the denser woody portions are however of more conservational significance as they form part of the dense savannah in closer proximity to the woody hill complex and adjacently located ESA. Although a portion of these denser woody areas will be transformed by the proposed development, the hill complex and ESA will remain intact and should provide sufficient remaining ecological connectivity and functionality.

Two isolated clumps of two and five medium sized tree individuals respectively of the nationally protected tree species *Vachellia erioloba* were found to be present within the southern portions of the eastern and western sections of the assessment area. They however fall outside the proposed footprints and it is therefore recommended that they be left in situ if practically possible. Two other isolated clumps of two and five medium sized tree individuals respectively of this species were also found to be present within two of the approximate 19 ha footprints of the eastern section. They will have to be removed. A single individual of the nationally protected tree species *Boscia albitrunca* was found to be present on the edge of the additional footprint associated with Alternative 1 (preferred) which must be left in situ. With the exception of a single individual of the provincially protected species *Boophone disticha*, no Red Data Listed-, or any other species of conservational significance were found to be present within the proposed cultivated pivot land footprints of the assessment area.

The open grassland of the assessment area is utilised by various smaller antelope species such as Steenbok (*Raphicerus campestris*), burrowing mammals as well as numerous reptiles such as lizards, snakes & tortoises for foraging/persistence habitat but the mobility of such animals along with the vast, continuous, undeveloped surrounding natural landscape allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas. The assessment area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (www.birdlife.org.za/conservation/important_bird_areas/iba-map). No important bird species, unique or specialised bird habitats were observed either.

The denser woody areas of the eastern section of the assessment area along with the hill complex are utilised by various larger antelope species such as Kudu as well as other mammal and bird species as refuge and for breeding/persistence purposes. It is therefore recommended that a sufficient corridor must be buffered out

around the footslope of the hill complex if practicably possible in order to ensure continued ecological connectivity and functionality of the adjacent ESA and to allow for movement of fauna and flora through the broader area.

It is in the opinion of the specialist that the only significant potential ecological impact identified and which cannot necessarily be suitably reduced and mitigated to within acceptable levels, is the removal of a significant number of tree/shrub individuals of the nationally protected species *Vachellia haematoxylon*. This potential ecological impact scored a slightly higher risk rating for Alternative 1 (preferred) than for Alternative 2 due to the additional approximate 19 ha footprint. The Department of Agriculture, Forestry and Fisheries (DAFF) should therefore be notified and adequately consulted during the Public Participation Process in order to obtain their comment and recommendations with regards to the viability of the proposed development. The rest of the potential ecological impacts identified can be suitably reduced and mitigated to within acceptable levels and the project should therefore be considered by the competent authority for environmental authorisation and approval. Although Alternative 1 (preferred) scored a slightly higher risk rating than Alternative 2, the difference in ecological impact is not deemed significant due to the small relative increase in transformed footprint. Either of the alternatives can therefore be considered by the competent authority depending on the comment and recommendations received from DAFF.

The proposed project may only continue if all recommended mitigations measures as per this ecological report are adequately implemented and managed for both the construction and operational phases of the proposed project. All necessary authorisations and permits must also be obtained prior to any commencement.

See specialist report in Appendix E1.

7.1.5 Agriculture and Soil Suitability Assessment

A Soil and Irrigation Suitability Assessment was conducted for the proposed project area in order to determine the agricultural value of the area. Digital Soils Africa conducted an irrigation potential soil survey for a 244 ha field on the Farm Reliance no. 347 in order to assess the suitability of the area for pivot irrigation for seed potatoes.

7.1.5.1 Soils forms

The soils encountered during the survey are shown in the table below (table 14).

Table 14: Soil form encountered

Soil Form	A Horizon	B Horizon	B2/C Horizon	Nr of Profiles
Hutton 1	Orthic A	Red Apedal B	Unspecified	11
Hutton 2	Orthic A	Red Apedal B	Stones	34

Bloemdal	Orthic A	Red Apedal B	Unspecified material with signs of wetness	1
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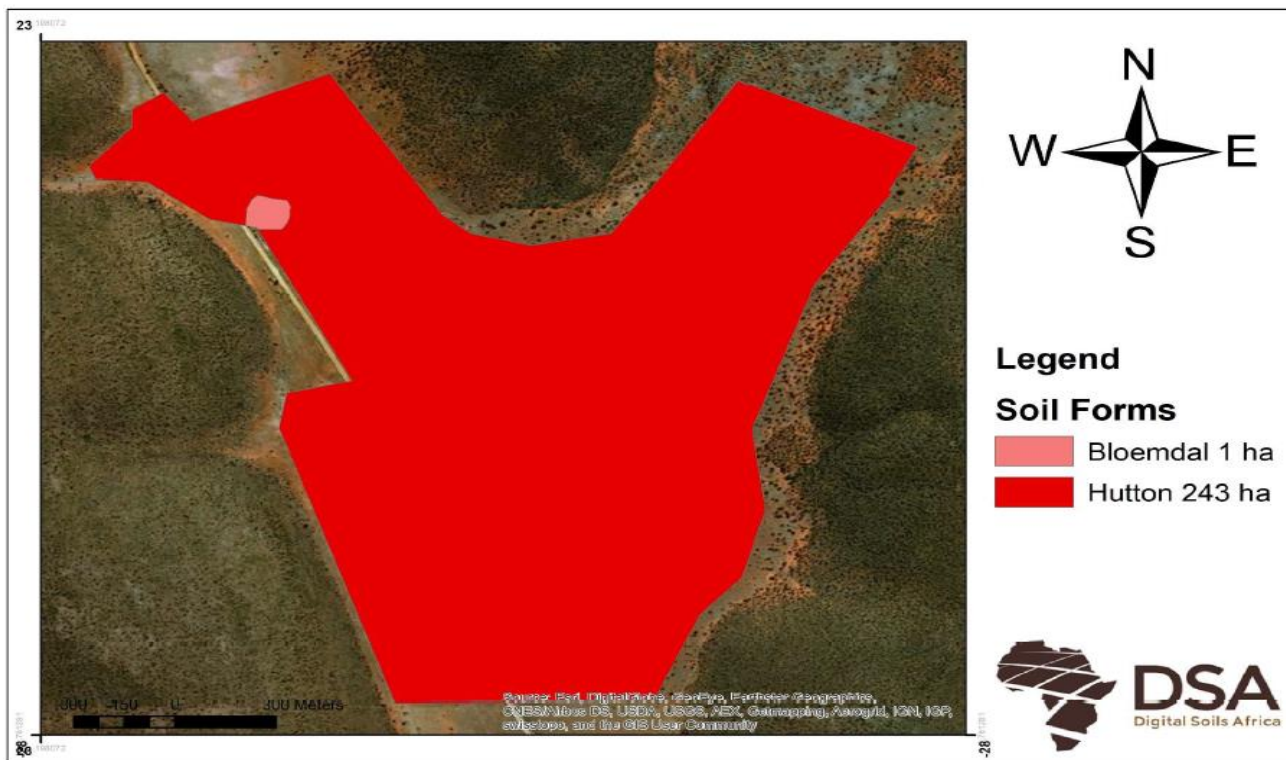


Figure 16: Illustration of soil forms encountered

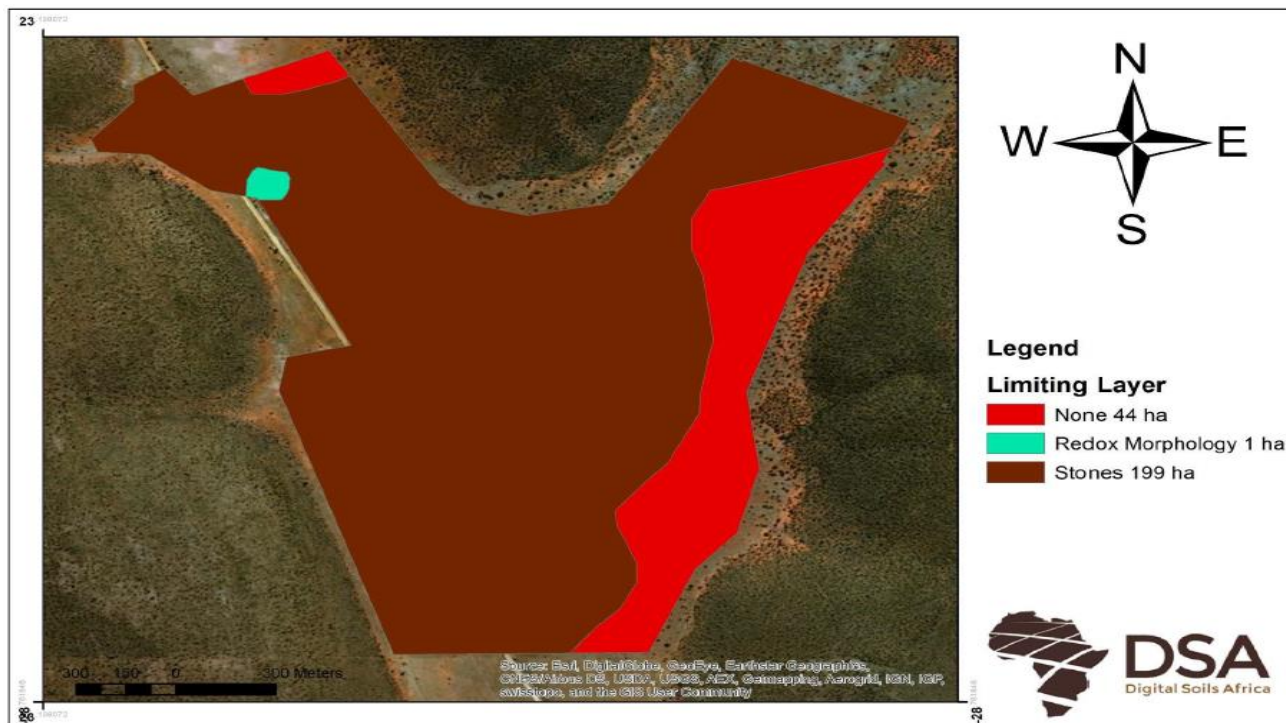


Figure 17: Illustration of infiltration limiting material

7.1.5.2 Soil Depth

The soil distribution of the surveyed area is shown in Figure 16. Figure 17 shows the depth of the red soil before it reaches the loose stones, unspecified material with signs of wetness or the bottom of the profile pit, while Figure 18 shows the drainable depth, which is the observation depth in all cases except for the Bloemdal observation.

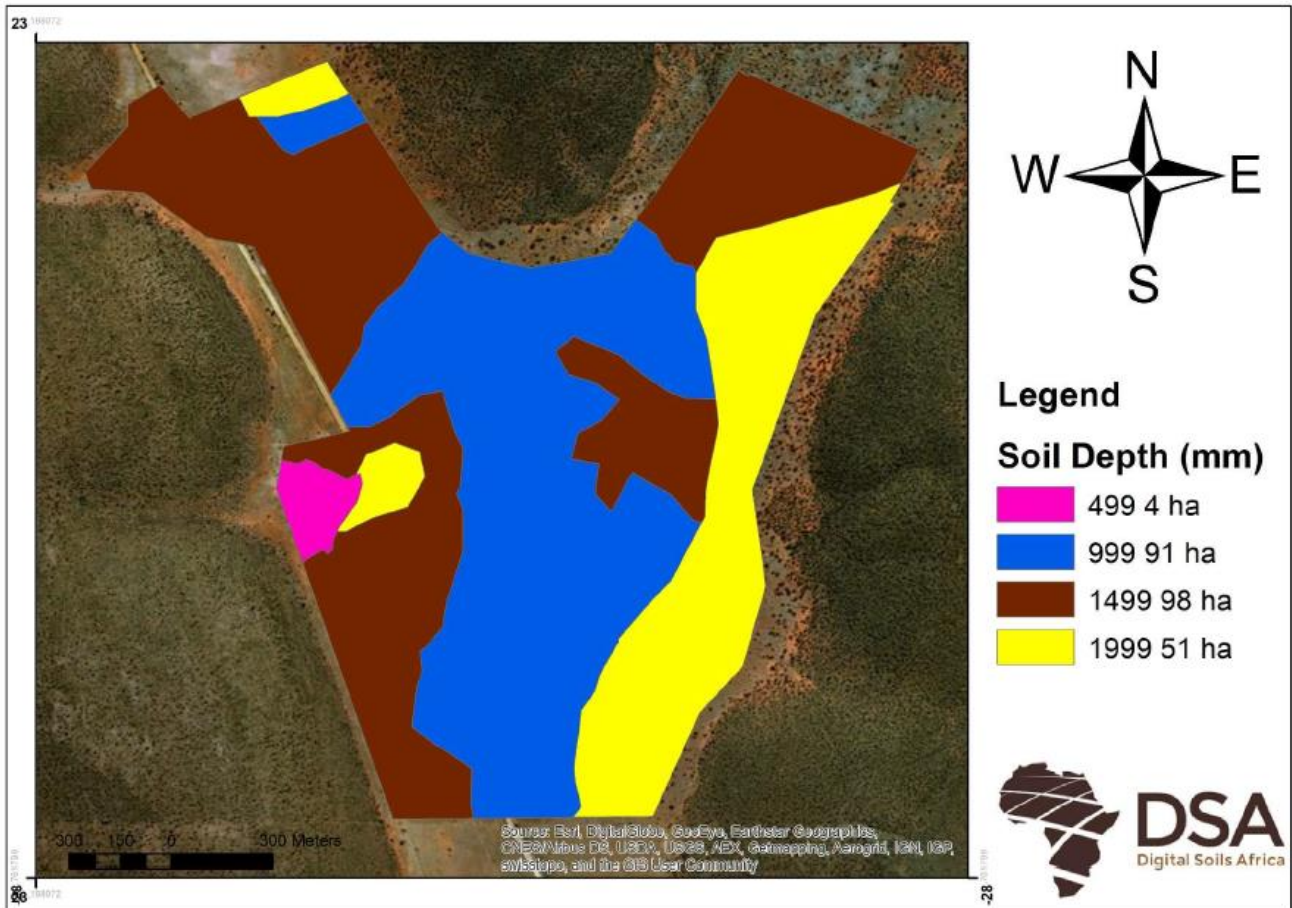


Figure 18: Illustration of drainable depths

7.1.5.3 Suitability

Based on soil morphology and laboratory analysis, the following areas are considered suitable for irrigation (Figure 19). For ease of monitoring, the areas are created in right shapes as seen in the figure below. The suitable areas cover 244 ha.



Figure 19: Illustration of suitability of the proposed project area

7.1.5.4 Conclusion

Soil morphological indicators and laboratory analysis indicate that the entire site of 244 ha is conducive to irrigation.

See specialist report in Appendix E3.

7.1.6 Heritage

A Phase 1 Heritage Impact Assessment was conducted for the proposed project area in order to determine the heritage value of the area as well as identify and evaluate the potential impacts that the proposed project will have on any areas of historical significance. This information was then used to determine possible mitigation measures which could be implemented in order to reduce the significance of the associated impacts. An overview of the heritage aspects surrounding the proposed project is provided in the section below:

The study area is located within a historically as well as prehistorically significant landscape. However, the field assessment indicates that the proposed pivot development will primarily affect geologically

recent soils in the form of well-developed wind-blown sand. The base of aeolian Kalahari Group sands, which cover vast areas in the region, have previously produced localized densities of Early and Middle Stone Age artifacts, but given the apparently sterile condition of the test pits and the fact that pivot farming largely effect the uppermost soil layer, impact on potentially intact Stone Age archaeological remains within the footprint is considered very low. Given the nature of the proposed development (installation of aboveground pivots), the terrain is not considered archaeologically vulnerable and is assigned a site rating of Generally Protected C

See specialist report in Appendix E2.

7.2 SOCIO-ECONOMIC DESCRIPTION

The proposed project does not hold any overriding negative social impacts to suggest a no development option. The investment, employment and income generation potential linked to the project will positively contribute to the socio-economic development objectives described in the local IDP.

The Department of Economic Development and Tourism in the Northern Cape has recently concluded the development of its Provincial Local Economic Development (LED) Strategy in line with the Northern Cape Growth and Development Strategy. The LED is an approach to sustainable economic development that encourages residents of local communities to work together to stimulate local economic activity that will result in, inter alia, an improvement in the quality of life for all in the local community. These Strategies provide the foundation for Integrated Economic Development Planning throughout the Northern Cape. A development such as the proposed project would present a definite benefit and addition to the LED through local job creation and skills development and contribute to the alleviation of poverty and unemployment in the local municipality. This will enable a better livelihood and a higher quality of life to individuals involved.

The following section will provide a brief insight as to the socio-economic conditions in the respective municipal areas:

Siyancuma local Municipality:

Employment:

There are 11 064 (out of 37 076) people that are economically active (employed or unemployed but looking for work), and of these, 28,2% are unemployed.

Of the 5 800 economically active youth (15–34 years) in the area, 35,2% are unemployed.

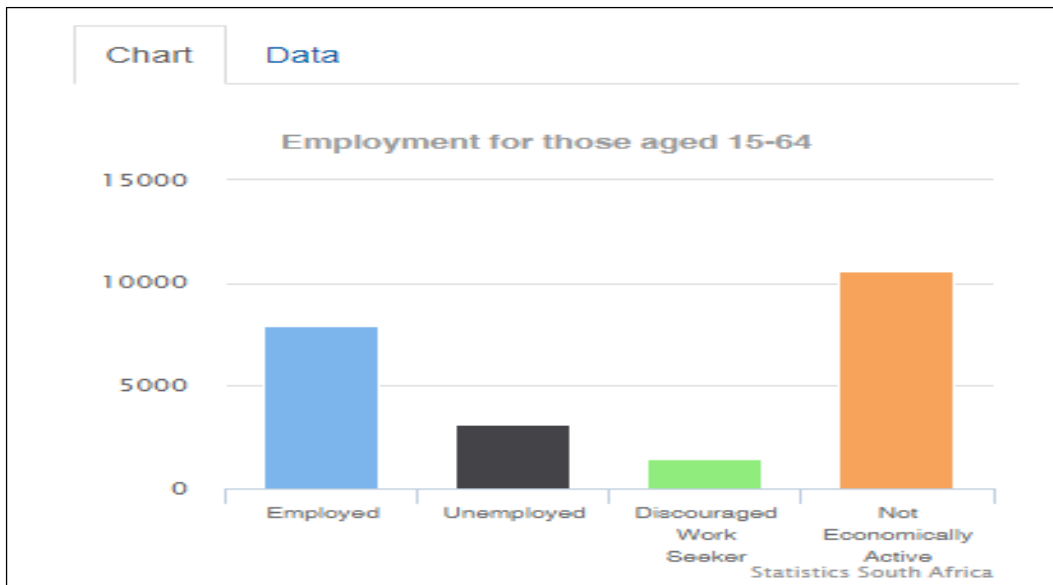


Figure 20: Employment Graph for those aged 15-64

Economic profile:

The Economic Profile of the Siyancuma Local Municipality is summarized below. It is clear that the fourth highest percentage of people have no income. This project will contribute by providing new working opportunities during the construction/preparations phase and operational phases.

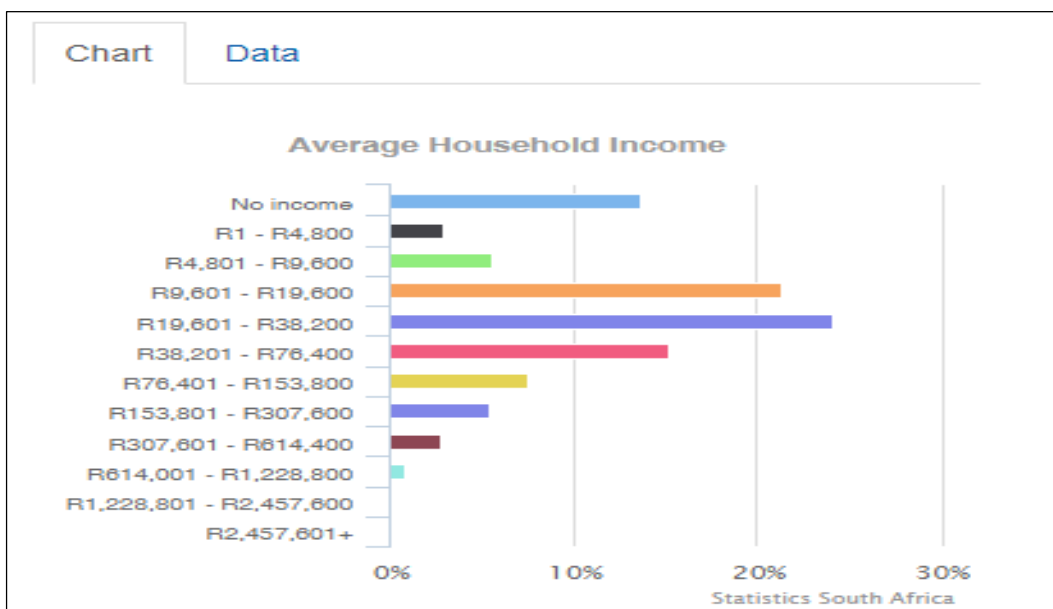


Figure 21: Economic profile graph indicating household income

Level of Education:

According to the Census, Siyancuma Local Municipality has a total population of 37 076 people. The majority of the population in the municipality are coloured at 57,5%,33,3% are black African,7,5% are White, 0,7% are Indian/Asian, with the other population groups making up the remaining 1,4%.

Of those aged 20 years and older,7,2% have completed primary school, 30,3% have some secondary education, 16,9% have completed matric and 5,4%have some form of higher education. Of the mentioned age group, 16,8% have no form of schooling.

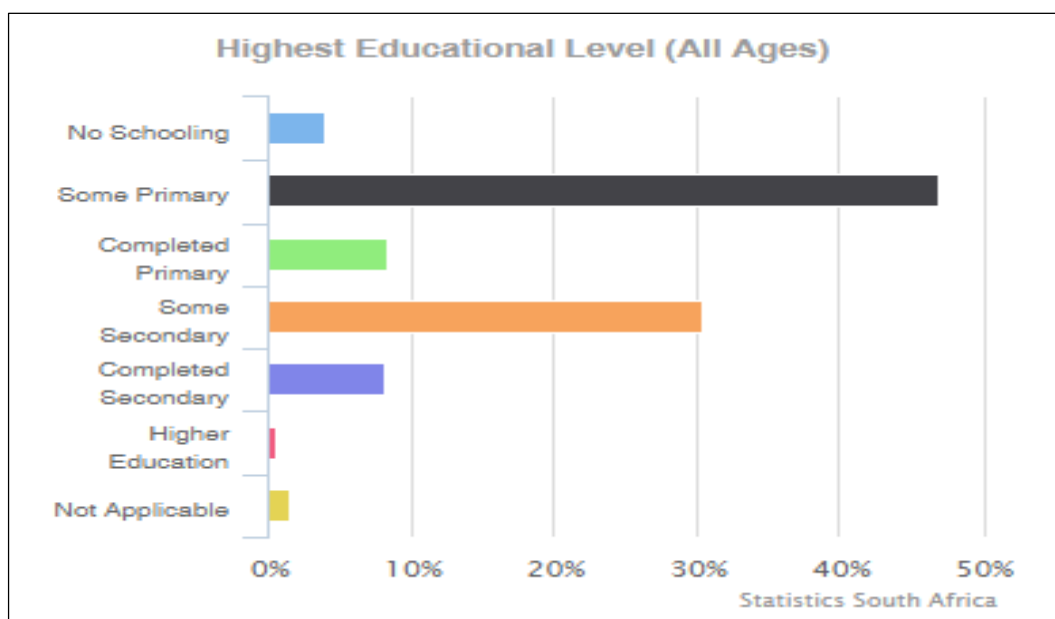


Figure 22: Education graph indicating education levels

Construction and operational phase job creation (local employment) and sustainable capacity building (skills, experience and resources development) of this project will aid in immediate and continuous local community upliftment and poverty alleviation and are therefore regarded as significant socio-economic benefits associated with the proposed project to motivate the need and desirability.

8. PUBLIC PARTICIPATION PROCESS

A continual and comprehensive Public Participation Process (PPP) was undertaken throughout the entire Scoping & EIA process with all stakeholders and Interested and Affected Parties (I & AP's), including the relevant organs of state and competent authority (Northern Cape Department of Environment and Nature Conservation) as identified during the Scoping Phase.

The PPP was conducted in accordance with the requirements of Regulation 41 of the EIA Regulations, 2017 and the designated Public Participation Officer will ensure that the PPP is facilitated in a manner which ensures reasonable opportunity for all stakeholders and registered I & AP's to comment and provide input on the proposed project.

8.1 SCOPING PHASE PUBLIC PARTICIPATION

The PPP for the draft Scoping Report commenced on 14 March 2018 and concluded on 14 April 2018. The following means were used to notify the public of the commencement of the process:

- Email notifications were sent to all identified stakeholders, relevant Organs of State and competent authority on 14 March 2018.
- An advertisement was placed in the local newspaper (Noorkaap Koerant) on 14 March 2018 to inform potential I & AP's and invite them to register for the proposed project.
- Written notices were placed at the Siyancuma local Municipality in Douglas, public library and post office on 14 March 2018.
- Site notices were placed at the main entrance of the Remaining Extent of the Farm Reliance no. 347 on 14 March 2018.
- Hardcopies of the draft Scoping Report were made available at the Siyancuma local Municipality in Douglas and the public library for public viewing on 14 March 2018.
- A hardcopy was hand delivered at the offices of the competent authority on 14 March 2018.

All stakeholders and I & AP's was adequately notified of the Public Participation Processes taking place as well as the availability of the relevant documents for comment as per Regulation 41 of the EIA Regulations, 2017.

An I & AP's register containing the names and contact details of all relevant stakeholders and I & AP's was established and is submitted to the competent authority along with this Final Scoping Report as per Regulation 42 of the EIA Regulations, 2017 (see Appendix C).

All proof of notifications, I & AP registrations as well as comments received and responses provided during the PPP were incorporated into a Public Participation Report which is available in Appendix C.

The Scoping Report was approved/ accepted by the competent authority on 08 June 2018.

8.1.1 Comments received and responses provided during the Scoping phase

All comments received from the stakeholders and I & AP's during the Scoping phase together with the subsequent responses provided were incorporated into the initial Public Participation Report which was submitted to the competent authority along with the Final Scoping Report.

See table below providing the summary of all comments and responses during the Scoping phase:

Table 15: Comments Received during the 30-day Scoping Phase Public Participation period

Comments Received during the 30 Day PPP on the Scoping Report				
Number	Organisation	Name	Tel/Cell	Email
1.	South African Heritage Resources Agency (SAHRA)	Me. Natasha Higgitt	021 462 4502	nhiggitt@sahra.org.za
Comments Received:	<p>SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objections to the proposed development and supports the recommendations of the specialist. The recommendations of the specialist and the following conditions must be included in the Environmental Management Programme (EMPr):</p> <ul style="list-style-type: none"> • The Final BAR and EMPr must be submitted for record purposes; • If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; • Should the project be granted Environmental Authorisation, SAHRA must be notified and all relevant documents submitted to the case file. <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p> <p>Yours faithfully</p>			
Response from EAP	<p>Good day Natasha</p> <p>Hope all is well?</p> <p>Thank you for the email and comments.</p> <p>This email confirms receipt of your comments.</p> <p>Kind regards</p>			

8.2 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The PPP for the Impact Assessment Report commenced on 17 July 2018 and concluded on 16 August 2018. The following means were used to notify the public of the commencement of the process:

- Email notifications were sent to all identified stakeholders, relevant Organs of State and competent authority on 17 July 2018.
- Hardcopies of the Impact Assessment Report were made available at the Griekwastad post office for public viewing on 17 July 2018.
- A hardcopy of the Impact Assessment Report was sent to DWS, the District Municipality, and the Local Municipality for public review on 17 July 2018.
- A hardcopy was hand delivered at the offices of the competent authority on 17 July 2018.

8.2.1 Comments received and responses provided during the Impact Assessment Phase

All comments received from the stakeholders and I & AP's during the Impact Assessment phase together with the subsequent responses provided were incorporated into the initial Public Participation Report which was submitted to the competent authority along with the Final Impact Assessment Report.

See table below providing the summary of all comments and responses during the Impact Assessment Phase phase:

Table 16: Comments Received during the 30-day Impact Assessment Phase Public Participation period

Comments Received during the 30 Day PPP on the Impact Assessment Report				
Number	Organisation	Name	Tel/Cell	Email
To be completed at the end of the 30 day PPP period				

8.3 LIST OF STAKEHOLDERS / ORGANS OF STATE / LANDOWNERS AND ADJACENT LANDOWNERS NOTIFIED

The following table (table 17) list all identified Stakeholders / Organs of State / Organisations / Interested and Affected Parties which were notified of the proposed project.

Table 17: Stakeholders / Organs of State / Organisations / Interested and Affected Parties notified

Name and Surname	Organisation	Department	Email / Postal:	Tel:
Mr. H.F. Nel	Siyancuma Local Municipality	Municipal Manager	geraldine@siyancuma.gov.za douglas@siyancuma.gov.za	(053) 298 1810

Mr. Chris Groenewald	Siyancuma Local Municipality	Environmental Department	groenewald@siyancuma.co.za	0828440411
Mr. J. George	Siyancuma Local Municipality	Ward 1 (one) Ward Councillor	Jgsiyancuma@gmail.com	073 5959 613
Mr. Rodney Pieterse	Pixley Ka Seme District Municipality	Municipal Manager	mm@pksgm.gov.za	0536310891
Mr. S. Nkondeshe	Pixley Ka Seme District Municipality	Environmental Department	pixley@telkomsa.net	0536310891
Me. Natalie Uys	Department of Environment and Nature Conservation	Ecological and Botanical Department	nuys.denc@gmail.com	053 807 7300/7472
Mr. Thulani Mthombeni	Department of Environment and Nature Conservation	Environmental Impact Assessment Department	Tmthombeni@ncpg.gov.za	(053) 807 7430 or Cell: 071 673 7525
Mr. Hannes Roux	Agri Noordkaap		hrouxx@gmail.com	0718607550
Mr. Khutjo Sekwaila	Northern Cape Department of Water and Sanitation	Commenting Authority for the region	sekwailak@dws.gov.za	053 836 7609
Me. Refilwe Damane	Northern Cape Department of Water and Sanitation	Commenting Authority for the region	DamaneR@dws.gov.za	053 836 7609
Mr. Tony Olyn	Northern Cape Department Minerals and Resources	Mineral Regulation	Tony.Olyn@dmr.gov.za	053 807 1705
Me. Jacoline Mans	DAFF - Department of Agriculture, Forestry and Fisheries	Commenting Authority	jacolinema@daff.gov.za	082 808 2737
Apie Barnard	Neighbouring / Surrounding Landowners / Occupiers		apiebarnard@wsinet.co.za	0845815722
Phia Coetzee	Neighbouring / Surrounding Landowners / Occupiers		phiacoetzee01@gmail.com	0833211324
Albie Barnard	Neighbouring / Surrounding Landowners / Occupiers		barnardalbie@gmail.com	0828801517

Narissa du Toit	Neighbouring / Surrounding Landowners / Occupiers		anphan@webmail.co.za	0835616149
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8.4 COMMENTS AND RESPONSES

All comments received from the I & AP's, stakeholders and organs of state together with the subsequent responses provided were incorporated into a Public Participation Report which is submitted to the competent authority together with the Final Impact Assessment report.

9. ENVIRONMENTAL IMPACT ASSESSMENT

The following section identifies the potential environmental impacts (both positive and negative) which the construction as well as operational phases of the proposed project will have on the surrounding environment.

Once the potential environmental impacts are identified, they are assessed by rating their Environmental Risk after which the final Environmental Significance is calculated and rated for each identified environmental impact.

The same Environmental Risk rating process is then followed for each environmental impact to determine the Environmental Significance if the recommended mitigation measures were to be implemented.

The objective of this section is therefore firstly to identify all the potential environmental impacts of the proposed project and secondly to determine the significance of the impacts and how effective the recommended mitigation measures will be able to reduce their significance. The potential environmental impacts which are still rated as highly significant, even after implementation of mitigations, can then be identified in order to specifically focus on implement of effective management strategies for them.

9.1 METHODOLOGY FOR IMPACT ASSESSMENT AND RISK RATING

The tables below indicate and explain the methodology and criteria used for the evaluation of the Environmental Risk Ratings as well as the calculation of the final Environmental Significance Ratings of the identified potential environmental impacts.

Each potential environmental impact is scored for each of the Evaluation Components as per the table below.

Table 18: Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating Scale and Description/criteria
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	<p>10 - Very high: Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p>8 - High: Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p>6 - Medium: Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p>4 - Low : Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p>2 - Very Low: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p>0 - Zero: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
	<p>10 - Very high (positive): Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p>8 - High (positive): Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p>

MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	<p>6 - Medium (positive): Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p> <p>4 - Low (positive): Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p>2 - Very Low (positive): Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p>0 - Zero (positive): Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
DURATION	<p>5 - Permanent</p> <p>4 - Long term: Impact ceases after operational phase/life of the activity > 60 years.</p> <p>3 - Medium term: Impact might occur during the operational phase/life of the activity – 60 years.</p> <p>2 - Short term: Impact might occur during the construction phase - < 3 years.</p> <p>1 - Immediate</p>
EXTENT (or spatial scale/influence of impact)	<p>5 - International: Beyond National boundaries.</p> <p>4 - National: Beyond Provincial boundaries and within National boundaries.</p> <p>3 - Regional: Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p>2 - Local: Within 5 km of the proposed development.</p> <p>1 - Site-specific: On site or within 100 m of the site boundary.</p> <p>0 - None</p>
IRREPLACEABLE loss of resources	<p>5 – Definite loss of irreplaceable resources.</p> <p>4 – High potential for loss of irreplaceable resources.</p> <p>3 – Moderate potential for loss of irreplaceable resources.</p> <p>2 – Low potential for loss of irreplaceable resources.</p> <p>1 – Very low potential for loss of irreplaceable resources.</p> <p>0 - None</p>
REVERSIBILITY of impact	<p>5 – Impact cannot be reversed.</p> <p>4 – Low potential that impact might be reversed.</p> <p>3 – Moderate potential that impact might be reversed.</p> <p>2 – High potential that impact might be reversed.</p> <p>1 – Impact will be reversible.</p> <p>0 – No impact.</p>
PROBABILITY (of occurrence)	<p>5 - Definite: >95% chance of the potential impact occurring.</p> <p>4 - High probability: 75% - 95% chance of the potential impact occurring.</p> <p>3 - Medium probability: 25% - 75% chance of the potential impact occurring</p> <p>2 - Low probability: 5% - 25% chance of the potential impact occurring.</p>

	1 - Improbable: <5% chance of the potential impact occurring.
Evaluation Component	Rating Scale and Description/criteria
CUMULATIVE impacts	<p>High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Low: The activity is localised and might have a negligible cumulative impact.</p> <p>None: No cumulative impact on the environment.</p>

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table 19 below. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Table 19: Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description/criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.

+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.
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9.2 DESCRIPTION OF POTENTIAL IMPACTS AND THEIR RECOMMENDED MITIGATION MEASURES

The following section provides a list of potential environmental impacts which the proposed project will have as well as the recommended mitigation measures to be implemented for each impact as identified during the Scoping phase.

9.2.1 Construction Phase

The potential environmental impacts associated with the construction / development phase of the proposed development.

9.2.1.1 Flora Impacts

A direct impact on flora will arise as a result of vegetation clearance.

Mitigation measures to reduce this potential impacts:

- Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation.
- Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.
- Existing roads and farm tracks in close proximity to the proposed project area must be used during construction.
- A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities.
- Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.
- Alien and invasive species need to be eradicated and controlled.

9.2.1.2 Fauna Impacts

A direct impact on flora will arise as a result of vegetation clearance / habitat loss

Mitigation measures to reduce potential impacts:

- The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.
- Existing roads and farm tracks in close proximity to the proposed project area must be used during construction.
- A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities.
- Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.
- Alien and invasive species need to be eradicated and controlled.

9.2.1.3 Dust Impacts

Dust nuisance generated during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.
- Access roads need to be well maintained and dust suppression need to be applied during windy days.
- Pivots need to be rehabilitated by planting buffalo grass while not in use (7-year cycle apply to these pivots)

9.2.1.4 Noise Impacts

Noise nuisance will be generated during the development / preparation of the pivots resulting from individuals and equipment.

Mitigation measures to reduce potential impacts:

- Limit working hours of noisy equipment to daylight hours.
- Fit silencers to equipment.
- Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays).

- Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- No loud music is permitted on site or in the camp.

9.2.1.5 Cultural and Heritage Impacts

Damage and destruction of vertebrate fossils during excavation activities may occur.

Mitigation measures to reduce potential impacts:

- Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority.
- Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given.
- Under no circumstances shall any heritage material be destroyed or removed from site.
- Excavations must be limited to the footprint area and be maintained in a narrow corridor.
- All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed:
 - All construction in the immediate 50 metre vicinity of the site must be ceased.
 - The heritage practitioner must be informed as soon as possible.
 - In the event of obvious human remains SAPS must be notified.
 - Mitigation measures (such as refilling) must not be attempted.
 - The area in a 50 metre radius of the find must be barricaded with visible taping.
- Public access must be limited and the area must be placed under guard.

9.2.1.6 Surface and Groundwater Contamination Impacts

Surface and Groundwater Contamination during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Ensure that excavation areas have a predetermined stockpile area for excavated materials.
- Use overburden for rehabilitation.
- Any remaining overburden to be disposed of at a licensed waste site.

- Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose.
- Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.
- All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.
- Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.
- Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).
- Vehicles and machinery must be regularly serviced to avoid spillages.
- Drip trays must be placed beneath all stationary construction equipment and beneath all generators present on site.

9.2.1.7 Waste Management Impacts

Waste impacts by means of waste storage and littering during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.
- Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.
- Keep all work sites including storage areas, offices and workshops neat and tidy.
- All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site.
- Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.
- The burning and burying of solid waste on site is prohibited.
- Littering by construction workers shall not be permitted.
- General waste shall be removed from site on a weekly basis to an approved landfill site.
- Minimise waste by sorting waste into recyclable and non-recyclable materials. Small scale agricultural job creation in the.

9.2.1.8 Traffic Impacts

Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods.
- All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle.
- Any damage to public roads is to be reported to the management authority and repaired to its original condition.
- Signage is to be placed on vehicles at all times.

9.2.1.9 Fire Risk Impacts

Increase risk of fires during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Ensure the work site and the contractor's camp is equipped with adequate firefighting equipment.
- All construction equipment must have at least one firefighting extinguisher.
- Workers must be adequately trained in the handling of firefighting equipment.
- No open fires are permitted anywhere on site due to the handling of gas on site. No fires will be permitted for heating or cooking purposes on site.
- Fuel and chemicals must be stored in an area that is acceptable for the client.
- No smoking will be allowed within close vicinity of the site.

9.2.1.10 Soil Contamination Impacts

Increased Soil contamination by means of hazardous substances.

Mitigation measures to reduce potential impacts:

- No leaked oil or fuel tankers may contaminate soil
- All tanks and pipes containing fuel or oil must be inspected on a regular basis
- Spills outside the bund area must be treated with a spill kit
- All significant leaks must be reported to the competent authority in terms of NEMA
- UST must be fitted with leak detectors in order to alert when a leak is occurring.

- Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices.
- Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher
- A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.
- All personnel working with fuel must undergo spill kit training
- The oil/water separator must be inspected on a regular basis and the inspection report must be provided to the ECO and relevant authority.
- Following a leak or accidental spill, a remediation plan must be compiled and executed.
- Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking.

9.2.1.11 Soil Erosion Impacts

Increased Soil erosion due to construction activities.

Mitigation measures to reduce potential impacts:

- During construction, un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated,
- All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,
- Temporary cut off drains may be required to capture storm water and promote infiltration,
- All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season.

9.2.1.12 Visual Impacts

Increased visual impact due to increased working activities on-site.

Mitigation measures to reduce potential impacts:

- All waste must be placed in bins during operational phase. Keeping the area litter free.
- Construction activities may only take place during normal working hours.

9.2.1.13 Socio-Economic Impacts

Increased socio-economic conditions due to job creation.

Mitigation measures to reduce potential impacts:

- Ensure that low-, medium- and high skilled workers use provided working opportunities.
- Low-, medium- and high skilled workers must be sourced locally.
- Where practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities.
- Individuals must be trained and continuously developed.

9.2.2 Operational Phase

The potential environmental impacts associated with the operational phase of the proposed development.

9.2.2.1 Flora Impacts

Direct impact on flora as a result of continuous vegetation clearance.

Mitigation measures to reduce potential impacts:

- Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.
- Existing roads and farm tracks in close proximity to the proposed project area must be used during operation.
- Alien and invasive species need to be eradicated and controlled.

9.2.2.2 Fauna Impacts

Continuous impact on Fauna as a result of cleared vegetation / habitat loss.

Mitigation measures to reduce potential impacts:

- Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.

- Existing roads and farm tracks in close proximity to the proposed project area must be used during operation.
- No hunting of any animal is to take place on site.
- Special care are to be taken not to work near or disturb any vulture nests, especially during breeding seasons.

9.2.2.3 Dust Impacts

Dust nuisance generated during the operational phase of the project.

Mitigation measures to reduce potential impacts:

- Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.
- Access roads need to be well maintained and dust suppression need to be applied during windy days.
- Pivots need to be rehabilitated by planting buffalo grass while not in use (7-year cycle apply to these pivots).

9.2.2.4 Noise Impacts

Noise nuisance generated during the operational phase of the pivots.

Mitigation measures to reduce potential impacts:

- Limit working hours of noisy equipment to daylight hours.
- Fit silencers to equipment.
- Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays).
- Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- No loud music is permitted on site or in the camp.

9.2.2.5 Cultural Heritage Impacts

Damage and destruction of vertebrate fossils during the operational phase.

Mitigation measures to reduce potential impacts:

- Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations, all works in the vicinity of the

finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority.

- Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given.
- Under no circumstances shall any heritage material be destroyed or removed from site.
- Excavations must be limited to the footprint area and be maintained in a narrow corridor.
- All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed:
 - All construction in the immediate 50 metre vicinity of the site must be ceased.
 - The heritage practitioner must be informed as soon as possible.
 - In the event of obvious human remains SAPS must be notified.
 - Mitigation measures (such as refilling) must not be attempted.
 - The area in a 50 metre radius of the find must be barricaded with visible taping.
- Public access must be limited and the area must be placed under guard.

9.2.2.6 Surface and Groundwater Impacts

Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.

Mitigation measures to reduce potential impacts:

- When fertilisers / pesticides are used, ensure that all fertilisers / pesticides are environmentally friendly.
- When fertilisers / pesticides are used, only use the correct amount as indicated by the parcels. Do not over use.
- Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.
- All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.
- Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.
- Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).
- Vehicles and machinery must be regularly serviced to avoid spillages.

- Drip trays must be placed beneath all stationary equipment and beneath all generators present on site.

9.2.2.7 Waste Management Impacts

As per the construction phase the area poses no archaeological and palaeontological significance or value.

Mitigation measures to reduce potential impacts:

- An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.
- Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.
- Keep all work sites including storage areas, offices and workshops neat and tidy.
- All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site.
- Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.
- The burning and burying of solid waste on site is prohibited.
- Littering by workers shall not be permitted.
- General waste shall be removed from site on a weekly basis to an approved landfill site.
- Minimise waste by sorting waste into recyclable and non-recyclable materials.

9.2.2.8 Traffic Impacts

Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.

Mitigation measures to reduce potential impacts:

- Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods.
- All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle.
- Any damage to public roads is to be reported to the management authority and repaired to its original condition.
- Signage is to be placed on vehicles at all times.

9.2.2.9 Fire Risk Impacts

Increase risk of fires during the operational phase of the pivots.

Mitigation measures to reduce potential impacts:

- Ensure the work site is equipped with adequate firefighting equipment.
- All equipment must have at least one firefighting extinguisher.
- Workers must be adequately trained in the handling of firefighting equipment.
- No open fires are permitted anywhere on site.
- No fires will be permitted for heating or cooking purposes on site.
- Fuel and chemicals must be stored in an area that is acceptable for the client.
- Dedicated smoking areas are to be provided.

9.2.2.10 Soil Contamination Impacts

Increased Soil contamination by means of hazardous substances.

Mitigation measures to reduce potential impacts:

- No leaked oil or fuel tankers may contaminate soil
- All tanks and pipes containing fuel or oil must be inspected on a regular basis
- Spills outside the bund area must be treated with a spill kit
- All significant leaks must be reported to the competent authority in terms of NEMA
- UST must be fitted with leak detectors in order to alert when a leak is occurring.
- Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices.
- Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher
- A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.
- All personnel working with fuel must undergo spill kit training
- Following a leak or accidental spill, a remediation plan must be compiled and executed.
- Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking.

9.2.2.11 Soil Erosion Impacts

Increased Soil erosion due to operational activities.

Mitigation measures to reduce potential impacts:

- During the operational phase, un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated,
- All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,
- Temporary cut off drains may be required to capture storm water and promote infiltration,
- All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season.

9.2.2.12 Visual Impacts

Increased visual impact due to increased working activities during the operational phase.

Mitigation measures to reduce potential impacts:

- All waste must be placed in bins during operational phase. Keeping the area litter free.
- Construction activities may only take place during normal working hours.

9.2.2.13 Socio-Economic Impacts

Increased socio-economic conditions due to job creation.

Mitigation measures to reduce potential impacts:

- Ensure that low-, medium- and high skilled workers use provided working opportunities.
- Low-, medium- and high skilled workers must be sourced locally.
- Were practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities.
- Individuals must be trained and continuously developed

9.2.3 Decommissioning Phase

The potential environmental impacts associated with the decommissioning phase of the proposed development.

9.2.3.1 Dust Impacts

Dust nuisance generated during the decommissioning phase of the project.

Mitigation measures to reduce potential impacts:

- Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.
- Access roads and pivot areas to be decommissioned are to be ripped and seeded for vegetation regrowth to avoid dust.
- Pivots need to be rehabilitated by planting buffalo grass.

9.2.3.2 Surface and Groundwater Contamination Impacts

Surface and Groundwater Contamination during the decommissioning phase by means of fertilizer and/or any other hazardous substances or pesticides.

Mitigation measures to reduce potential impacts:

- When fertilisers / pesticides are used in the planting of seeds, ensure that all fertilisers / pesticides are environmentally friendly.
- When fertilisers / pesticides are used, only use the correct amount as indicated by the parcels. Do not over use.
- Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.
- All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.
- Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.
- Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).
- Vehicles and machinery must be regularly serviced to avoid spillages.
- Drip trays must be placed beneath all stationary equipment and beneath all generators present on site.

9.2.3.3 Waste Management Impacts

Waste impacts by means of waste storage and littering during the decommissions phase of the pivots.

Mitigation measures to reduce potential impacts:

- An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.

- Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.
- Keep all work sites including storage areas, offices and workshops neat and tidy.
- All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site.
- Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.
- The burning and burying of solid waste on site is prohibited.
- Littering by workers shall not be permitted.
- General waste shall be removed from site to an approved landfill site.

9.2.3.4 Soil Contamination Impacts

Increased Soil contamination by means of hazardous substances.

Mitigation measures to reduce potential impacts:

- No leaked oil or fuel tankers may contaminate soil
- Spills outside the bund area must be treated with a spill kit
- All significant leaks must be reported to the competent authority in terms of NEMA
- Following a leak or accidental spill, a remediation plan must be compiled and executed.

9.2.3.5 Soil Erosion Impacts

Increased Soil erosion due to decommissioning activities.

Mitigation measures to reduce potential impacts:

- During the decommissioning phase, un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated,
- All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,
- Temporary cut off drains may be required to capture storm water and promote infiltration,

9.2.3.6 Socio-Economic Impacts

Increased socio-economic conditions due to job loss.

Mitigation measures to reduce potential impacts:

- Ensure that low-, medium- and high skilled workers working at the farm are given advance notice in terms of the decommissioning.
- Assist Low-, medium- and high skilled worker in finding other possible vacancies.

9.3 RISK RATINGS OF POTENTIAL IMPACTS

The following section provides the Environmental Risk as well as the Environmental Significance Ratings for the potential environmental impacts for the proposed project both before and after implementation of the recommended mitigation measures.

9.4 IMPACT ASSESSMENT

9.4.1 Planning, Design and Construction Phase

PLANNING, DESIGN AND CONSTRUCTION PHASE					
Potential Flora Impacts:					
Nature of impact: Direct impact on Flora as a result of the transformation of terrestrial vegetation on the assessment area associated with the Olifantshoek Plains Thornveld vegetation type (SVk 13).				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	4	4	2
Duration:	4	4	4	4	1
Extent:	1	1	1	1	1
Irreplaceable:	2	2	2	2	1
Reversibility:	3	3	3	3	2
Probability:	4	4	4	4	2
Total SP:	64	56	56	56	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Nature of impact: Direct impact on Flora as a result of the destruction/damage to Red Data Listed, nationally or provincially protected species individuals associated with the Olifantshoek Plains Thornveld vegetation type (SVk 13)				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	

Magnitude:	6	4	4	4	2
Duration:	5	5	5	5	1
Extent:	1	1	1	1	1
Irreplaceable:	3	3	3	3	1
Reversibility:	4	4	4	4	2
Probability:	4	4	4	4	2
Total SP:	76	68	68	68	14
Significance rating:	Medium-high (MH)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Nature of impact: Direct impact on Flora as a result of alien invasive species establishment			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	2	2	2	2	1
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	1	2	1	2
Probability:	3	1	3	1	2
Total SP:	36	9	36	9	14
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 				

	<ul style="list-style-type: none"> The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Potential Avifauna Impacts:					
Nature of impact: Direct impact on other avifaunal species as a result of vegetation clearance transforming the breeding habitat			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	4	4	2
Duration:	5	5	5	5	1
Extent:	1	1	1	1	1
Irreplaceable:	3	3	3	3	1
Reversibility:	4	4	4	4	2
Probability:	4	4	4	4	2
Total SP:	76	68	68	68	14
Significance rating:	Medium-high (MH)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A suitable ecological offset area, which can be formally protected in order to compensate for the transformation of the proposed project area, need to be applied for and registered. An additional Avifaunal walkthrough is to be conducted prior to the commencement of the project in order to determine if Vulture are in breeding time and to possibly help with the identification of trees before they are removed. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Nature of impact:			Activity:		

Direct impact on other avifaunal species as a result of vegetation clearance transforming the foraging area			Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	2
Duration:	4	4	4	4	3
Extent:	3	3	3	3	1
Irreplaceable:	3	3	3	3	1
Reversibility:	3	3	3	3	1
Probability:	4	4	4	4	1
Total SP:	68	60	68	60	8
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A suitable ecological offset area, which can be formally protected in order to compensate for the transformation of the proposed project area, need to be applied for and registered. An additional Avifaunal walkthrough is to be conducted prior to the commencement of the project in order to determine if Vulture are in breeding time and to possibly help with the identification of trees before they are removed. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Potential Fauna Impacts:					
Nature of impact: Direct impact on other faunal species as a result of vegetation clearance transforming the breeding habitat			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	4	4	2
Duration:	5	5	5	5	1
Extent:	1	1	1	1	1
Irreplaceable:	3	3	3	3	1

Reversibility:	4	4	4	4	2
Probability:	4	4	4	4	2
Total SP:	76	68	68	68	14
Significance rating:	Medium-high (MH)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A suitable ecological offset area, which can be formally protected in order to compensate for the transformation of the proposed project area, need to be applied for and registered. An additional Avifaunal walkthrough is to be conducted prior to the commencement of the project in order to determine if Vulture are in breeding time and to possibly help with the identification of trees before they are removed. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Nature of impact: Direct impact on other faunal species as a result of vegetation clearance transforming the foraging area			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	2
Duration:	4	4	4	4	3
Extent:	3	3	3	3	1
Irreplaceable:	3	3	3	3	1
Reversibility:	3	3	3	3	1
Probability:	4	4	4	4	1
Total SP:	68	60	68	60	8
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. A suitable ecological offset area, which can be formally protected in order to compensate for the transformation of the proposed project area, need to be applied for and registered. 				

	<ul style="list-style-type: none"> An additional Avifaunal walkthrough is to be conducted prior to the commencement of the project in order to determine if Vulture are in breeding time and to possibly help with the identification of trees before they are removed. A Provincial Flora Permit and National Protected Tree Permit has to be obtained prior to the commencement of any construction activities. Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment. Alien and invasive species need to be eradicated and controlled. 				
Potential Dust Impacts:					
Nature of impact: Dust nuisance generated during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	2
Duration:	2	2	2	2	2
Extent:	2	2	2	2	1
Irreplaceable:	1	2	1	2	1
Reversibility:	2	1	2	1	2
Probability:	4	2	4	2	2
Total SP:	44	18	44	18	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Dust Management measures must be implemented in order to manage and minimize undesired dust emissions. Access roads need to be well maintained and dust suppression need to be applied during windy days. Pivots need to be rehabilitated by planting buffalo grass while not in use (7-year cycle apply to these pivots) 				
Potential Noise Impacts:					
Nature of impact: Noise nuisance generated during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	2	2	2	2	2
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	1	2	1	2
Probability:	2	2	2	2	2

Total SP:	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • Limit working hours of noisy equipment to daylight hours. • Fit silencers to equipment. • Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays). • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours. • No loud music is permitted on site or in the camp. 				
Potential Cultural and Heritage Impacts:					
Nature of impact: Damage and destruction of vertebrate fossils during excavation activities.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	2	1	2	1	1
Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	2	1	2	1	1
Probability:	1	1	1	1	1
Total SP:	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given. • Under no circumstances shall any heritage material be destroyed or removed from site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor. • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: <ul style="list-style-type: none"> • All construction in the immediate 50 metre vicinity of the site must be ceased. • The heritage practitioner must be informed as soon as possible. • In the event of obvious human remains SAPS must be notified. • Mitigation measures (such as refilling) must not be attempted. 				

	<ul style="list-style-type: none"> The area in a 50 metre radius of the find must be barricaded with visible taping. Public access must be limited and the area must be placed under guard. 				
Potential Surface and Groundwater Contamination Impacts:					
Nature of impact: Surface and Groundwater Contamination during the development / preparation of the pivots.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	0
Extent:	2	1	2	1	0
Irreplaceable:	1	1	1	1	0
Reversibility:	1	1	1	1	0
Probability:	1	1	1	1	0
Total SP:	7	4	7	4	0
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Ensure that excavation areas have a predetermined stockpile area for excavated materials. Use overburden for rehabilitation. Any remaining overburden to be disposed of at a licensed waste site. Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose. Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages. All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO. Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site. Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender). Vehicles and machinery must be regularly serviced to avoid spillages. Drip trays must be placed beneath all stationary construction equipment and beneath all generators present on site. 				
Nature of impact: Impeding and contamination of the surface water catchment and drainage area towards the south				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	2	2	2	2	0

Extent:	3	2	3	2	0
Irreplaceable:	3	2	3	2	0
Reversibility:	2	2	2	2	0
Probability:	2	1	2	1	0
Total SP:	24	10	24	10	0
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • Ensure that excavation areas have a predetermined stockpile area for excavated materials. • Use overburden for rehabilitation. • Any remaining overburden to be disposed of at a licensed waste site. • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose. • Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages. • All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO. • Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site. • Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender). • Vehicles and machinery must be regularly serviced to avoid spillages. • Drip trays must be placed beneath all stationary construction equipment and beneath all generators present on site. 				
Potential Waste Management Impacts:					
Nature of impact: Waste impacts by means of waste storage and littering during the development / preparation of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	2	2	2	2	2
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	1	2	1	2
Probability:	2	2	2	2	2
Total SP:	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited. 				

	<ul style="list-style-type: none"> Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle. Keep all work sites including storage areas, offices and workshops neat and tidy. All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site. Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised. The burning and burying of solid waste on site is prohibited. Littering by construction workers shall not be permitted. General waste shall be removed from site on a weekly basis to an approved landfill site. Minimise waste by sorting waste into recyclable and non-recyclable materials. 				
Potential Traffic Impacts:					
Nature of impact: Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	2	1	2	1	1
Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	2	1	2	1	1
Probability:	1	1	1	1	1
Total SP:	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods. All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Any damage to public roads is to be reported to the management authority and repaired to its original condition. Signage is to be placed on vehicles at all times. 				
Potential Fire Risk Impacts:					
Nature of impact: Increase risk of fires during the development / preparation of the pivots.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0

Duration:	1	1	1	1	1
Extent:	2	1	2	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	2	1	2	1	1
Probability:	1	1	1	1	1
Total SP:	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	<ul style="list-style-type: none"> • Ensure the work site and the contractor's camp is equipped with adequate firefighting equipment. • All construction equipment must have at least one firefighting extinguisher. • Workers must be adequately trained in the handling of firefighting equipment. • No open fires are permitted anywhere on site due to the handling of gas on site. No fires will be permitted for heating or cooking purposes on site. • Fuel and chemicals must be stored in an area that is acceptable for the client. • No smoking will be allowed within close vicinity of the site. 				
Potential Soil Contamination Impacts:					
Nature of impact: Increased Soil contamination by means of hazardous substances.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	1
Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	1	0	1	0	1
Probability:	2	1	2	1	1
Total SP:	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • No leaked oil or fuel tankers may contaminate soil • All tanks and pipes containing fuel or oil must be inspected on a regular basis • Spills outside the bund area must be treated with a spill kit • All significant leaks must be reported to the competent authority in terms of NEMA • UST must be fitted with leak detectors in order to alert when a leak is occurring. • Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices. • Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher 				

	<ul style="list-style-type: none"> • A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions. • All personnel working with fuel must undergo spill kit training • The oil/water separator must be inspected on a regular basis and the inspection report must be provided to the ECO and relevant authority. • Following a leak or accidental spill, a remediation plan must be compiled and executed. • Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking. 				
Potential Soil Erosion Impacts:					
Nature of impact: Increased Soil erosion due to construction activities.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	0
Duration:	2	2	2	2	1
Extent:	2	2	2	2	1
Irreplaceable:	1	1	1	1	1
Reversibility:	2	1	2	1	1
Probability:	2	1	2	1	1
Total SP:	22	8	22	8	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • During construction, un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated, • All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line, • Temporary cut off drains may be required to capture storm water and promote infiltration, • All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season. 				
Potential Visual Impacts:					
Nature of impact: Increased visual impact due to increased working activities on-site.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	1
Extent:	1	1	1	1	1

Irreplaceable:	2	1	2	1	1
Reversibility:	1	0	1	0	1
Probability:	2	1	2	1	1
Total SP:	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> All waste must be placed in bins during operational phase. Keeping the area litter free. Construction activities may only take place during normal working hours. 				
Potential Socio-Economic Impacts:					
Nature of impact: Increased socio-economic conditions due to job creation			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	8	6	8	8
Duration:	1	1	1	1	1
Extent:	2	2	2	2	2
Irreplaceable:	2	2	2	2	2
Reversibility:	2	2	2	2	2
Probability:	4	5	4	5	4
Total SP:	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)
Proposed Mitigation:	<ul style="list-style-type: none"> Ensure that low-, medium- and high skilled workers use provided working opportunities. Low-, medium- and high skilled workers must be sourced locally. Were practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities. Individuals must be trained and continuously developed 				

9.4.2 Operational Phase Impacts

OPERATIONAL PHASE	
Potential Flora Impacts:	
Nature of impact: Direct impact on flora as a result of Alien invasive species establishment	Activity: Proposed development of seed potato pivots

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	2	6	2	2
Duration:	3	2	3	2	2
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	2	2	2	2
Probability:	3	1	3	1	2
Total SP:	45	10	45	10	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during operation. Alien and invasive species need to be eradicated and controlled. 				
Nature of impact: Impeding of the ecological connectivity and functionality of the broader remaining natural area			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	2
Duration:	3	1	3	1	2
Extent:	2	1	2	1	1
Irreplaceable:	3	1	3	1	1
Reversibility:	3	1	3	1	2
Probability:	3	2	3	2	2
Total SP:	45	12	45	12	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place. Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during operation. 				

	<ul style="list-style-type: none"> Alien and invasive species need to be eradicated and controlled. 				
Potential Fauna and Avifauna Impacts:					
Nature of impact: Continuous impact on Fauna as a result of cleared vegetation / habitat loss.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	5	5	5	5	2
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	1	2	1	2
Probability:	2	2	2	2	2
Total SP:	26	24	26	14	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ. Existing roads and farm tracks in close proximity to the proposed project area must be used during operation. No hunting of any animal is to take place on site. Special care are to be taken not to work near or disturb any vulture nests, especially during breeding seasons. 				
Potential Dust Impacts:					
Nature of impact: Dust nuisance generated during the operational phase of the project.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	2
Duration:	3	2	3	2	2
Extent:	2	2	2	2	1
Irreplaceable:	1	2	1	2	1
Reversibility:	2	1	2	1	2
Probability:	4	2	4	2	2
Total SP:	48	18	48	18	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Dust Management measures must be implemented in order to manage and minimize undesired dust emissions. 				

	<ul style="list-style-type: none"> Access roads need to be well maintained and dust suppression need to be applied during windy days. Pivots need to be rehabilitated by planting buffalo grass while not in use (7-year cycle apply to these pivots) 				
Potential Noise Impacts:					
Nature of impact: Noise nuisance generated during the operational phase of the pivots.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	2	2	2	2	2
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	1	2	1	2
Probability:	2	2	2	2	2
Total SP:	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Limit working hours of noisy equipment to daylight hours. Fit silencers to equipment. Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays). Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours. No loud music is permitted on site or in the camp. 				
Potential Cultural and Heritage Impacts:					
Nature of impact: Damage and destruction of vertebrate fossils during the operational phase.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	2	1	2	1	1
Extent:	1	1	1	1	1
Irreplaceable:	1	1	1	1	1
Reversibility:	1	1	1	1	1
Probability:	1	1	1	1	1
Total SP:	7	6	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations, all works in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority. Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given. Under no circumstances shall any heritage material be destroyed or removed from site. Excavations must be limited to the footprint area and be maintained in a narrow corridor. All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: <ul style="list-style-type: none"> All construction in the immediate 50 metre vicinity of the site must be ceased. The heritage practitioner must be informed as soon as possible. In the event of obvious human remains SAPS must be notified. Mitigation measures (such as refilling) must not be attempted. The area in a 50 metre radius of the find must be barricaded with visible taping. Public access must be limited and the area must be placed under guard. 				
Potential Surface and Groundwater Contamination Impacts:					
Nature of impact: Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	0
Extent:	2	1	2	1	0
Irreplaceable:	1	1	1	1	0
Reversibility:	1	1	1	1	0
Probability:	1	1	1	1	0
Total SP:	7	4	7	4	0
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> When fertilisers / pesticides are used, ensure that all fertilisers / pesticides are environmentally friendly. When fertilisers / pesticides are used, only use the correct amount as indicated by the parcels. Do not over use. Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages. 				

	<ul style="list-style-type: none"> All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO. Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site. Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender). Vehicles and machinery must be regularly serviced to avoid spillages. Drip trays must be placed beneath all stationary equipment and beneath all generators present on site. 				
Nature of impact: Impeding and contamination of the surface water catchment and drainage area towards the south			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	3	3	3	3	0
Extent:	3	2	3	2	0
Irreplaceable:	3	2	3	2	0
Reversibility:	2	2	2	2	0
Probability:	2	1	2	1	0
Total SP:	26	11	26	11	0
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Ensure that excavation areas have a predetermined stockpile area for excavated materials. Use overburden for rehabilitation. Any remaining overburden to be disposed of at a licensed waste site. Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose. Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages. All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO. Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site. Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender). Vehicles and machinery must be regularly serviced to avoid spillages. Drip trays must be placed beneath all stationary construction equipment and beneath all generators present on site. 				
Potential Waste Management Impacts:					
Nature of impact: Waste impacts by means of waste storage and littering during the operational phase of the pivots.			Activity: Proposed development of seed potato pivots		
	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	2	2	2	2	2
Extent:	2	2	2	2	1
Irreplaceable:	2	2	2	2	1
Reversibility:	2	1	2	1	2
Probability:	2	2	2	2	2
Total SP:	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited. • Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle. • Keep all work sites including storage areas, offices and workshops neat and tidy. • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site. • Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised. • The burning and burying of solid waste on site is prohibited. • Littering by workers shall not be permitted. • General waste shall be removed from site on a weekly basis to an approved landfill site. • Minimise waste by sorting waste into recyclable and non-recyclable materials. 				
Potential Traffic Impacts:					
Nature of impact: Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	2	1	2	1	1
Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	2	1	2	1	1
Probability:	1	1	1	1	1
Total SP:	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods. All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Any damage to public roads is to be reported to the management authority and repaired to its original condition. Signage is to be placed on vehicles at all times. 				
Potential Fire Risk Impacts:					
Nature of impact: Increase risk of fires during the operational phase of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	0
Duration:	2	1	2	1	1
Extent:	1	1	1	1	1
Irreplaceable:	1	1	1	1	1
Reversibility:	1	1	1	1	1
Probability:	1	1	1	1	1
Total SP:	7	6	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	<ul style="list-style-type: none"> Ensure the work site is equipped with adequate firefighting equipment. All equipment must have at least one firefighting extinguisher. Workers must be adequately trained in the handling of firefighting equipment. No open fires are permitted anywhere on site. No fires will be permitted for heating or cooking purposes on site. Fuel and chemicals must be stored in an area that is acceptable for the client. Dedicated smoking areas are to be provided. 				
Potential Soil Contamination Impacts:					
Nature of impact: Increased Soil contamination by means of hazardous substances.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	1

Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	1	0	1	0	1
Probability:	2	1	2	1	1
Total SP:	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> No leaked oil or fuel tankers may contaminate soil All tanks and pipes containing fuel or oil must be inspected on a regular basis Spills outside the bund area must be treated with a spill kit All significant leaks must be reported to the competent authority in terms of NEMA UST must be fitted with leak detectors in order to alert when a leak is occurring. Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices. Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions. All personnel working with fuel must undergo spill kit training Following a leak or accidental spill, a remediation plan must be compiled and executed. Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking. 				
Potential Soil Erosion Impacts:					
Nature of impact: Increased Soil erosion due to operational activities.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	0
Duration:	1	1	1	1	1
Extent:	2	1	2	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	1	1	1	1	1
Probability:	2	1	2	1	1
Total SP:	20	6	20	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	<ul style="list-style-type: none"> During the operational phase, un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated, 				

	<ul style="list-style-type: none"> All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line, Temporary cut off drains may be required to capture storm water and promote infiltration, All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season. 				
Potential Visual Impacts:					
Nature of impact: Increased visual impact due to increased working activities during the operational phase.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	1
Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	1	0	1	0	1
Probability:	2	1	2	1	1
Total SP:	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> All waste must be placed in bins during operational phase. Keeping the area litter free. Construction activities may only take place during normal working hours. 				
Potential Water Usage Impacts:					
Nature of impact: Impact on water usage due to over extraction from groundwater.				Activity: Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	4	2	4	2	0
Duration:	3	3	3	3	1
Extent:	3	3	3	3	1
Irreplaceable:	3	3	3	3	1
Reversibility:	4	4	4	4	1
Probability:	4	2	4	2	1
Total SP:	68	30	68	30	4
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	
Proposed Mitigation:	<ul style="list-style-type: none"> All waste must be placed in bins during operational phase. Keeping the area litter free. Construction activities may only take place during normal working hours. 					
Potential Socio-Economic Impacts:						
Nature of impact:	Increased socio-economic conditions due to job creation			Activity:	Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative	
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation		
Magnitude:	6	8	6	8	8	
Duration:	1	1	1	1	1	
Extent:	2	2	2	2	2	
Irreplaceable:	2	2	2	2	2	
Reversibility:	2	2	2	2	2	
Probability:	4	5	4	5	4	
Total SP:	52	75	52	75	60	
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)	
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)	
Proposed Mitigation:	<ul style="list-style-type: none"> Ensure that low-, medium- and high skilled workers use provided working opportunities. Low-, medium- and high skilled workers must be sourced locally. Were practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities. Individuals must be trained and continuously developed 					

9.4.3 Decommissioning Phase Impacts

DECOMMISSION PHASE						
Potential Dust Impacts:						
Nature of impact:	Dust nuisance generated during the decommissioning phase of the project.			Activity:	Proposed development of seed potato pivots	
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative	
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation		
Magnitude:	6	4	4	2	2	
Duration:	1	1	1	1	2	
Extent:	2	2	2	2	1	

Irreplaceable:	1	1	1	1	1
Reversibility:	2	1	2	1	2
Probability:	2	2	2	2	2
Total SP:	24	18	20	14	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> Dust Management measures must be implemented in order to manage and minimize undesired dust emissions. Access roads and pivot areas to be decommissioned are to be ripped and seeded for vegetation regrowth to avoid dust. Pivots need to be rehabilitated by planting buffalo grass. 				
Potential Surface and Groundwater Contamination Impacts:					
Nature of impact: Surface and Groundwater Contamination during the decommissioning phase by means of fertilizer and/or any other hazardous substances or pesticides.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	1
Extent:	2	1	2	1	1
Irreplaceable:	1	1	1	1	1
Reversibility:	1	1	1	1	1
Probability:	1	1	1	1	1
Total SP:	7	4	7	4	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> When fertilisers / pesticides are used in the planting of seeds, ensure that all fertilisers / pesticides are environmentally friendly. When fertilisers / pesticides are used, only use the correct amount as indicated by the parcels. Do not over use. Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages. All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO. Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site. Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender). Vehicles and machinery must be regularly serviced to avoid spillages. Drip trays must be placed beneath all stationary equipment and beneath all generators present on site. 				
Potential Waste Management Impacts:					

Nature of impact: Waste impacts by means of waste storage and littering during the decommissions phase of the pivots.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2
Duration:	1	1	1	1	2
Extent:	1	1	1	1	1
Irreplaceable:	1	1	1	1	1
Reversibility:	1	1	1	1	2
Probability:	1	1	1	1	2
Total SP:	6	6	6	6	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> • An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited. • Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle. • Keep all work sites including storage areas, offices and workshops neat and tidy. • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site. • Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised. • The burning and burying of solid waste on site is prohibited. • Littering by workers shall not be permitted. • General waste shall be removed from site to an approved landfill site. 				
Potential Soil Contamination Impacts:					
Nature of impact: Increased Soil contamination by means of hazardous substances.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	0
Duration:	1	1	1	1	1
Extent:	2	1	2	1	1
Irreplaceable:	1	1	1	1	1
Reversibility:	1	1	1	1	1
Probability:	1	1	1	1	1
Total SP:	7	4	7	4	4

Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> No leaked oil or fuel tankers may contaminate soil Spills outside the bund area must be treated with a spill kit All significant leaks must be reported to the competent authority in terms of NEMA Following a leak or accidental spill, a remediation plan must be compiled and executed. 				
Potential Soil Erosion Impacts:					
Nature of impact: Increased Soil erosion due to decommissioning activities.			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	4	2	0
Duration:	2	2	2	2	1
Extent:	1	1	1	1	1
Irreplaceable:	2	1	2	1	1
Reversibility:	2	1	2	1	1
Probability:	2	1	2	1	1
Total SP:	26	9	22	7	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	<ul style="list-style-type: none"> During the decommissioning phase, un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated, All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line, Temporary cut off drains may be required to capture storm water and promote infiltration, 				
Potential Socio-Economic Impacts:					
Nature of impact: Increased socio-economic conditions due to job loss			Activity: Proposed development of seed potato pivots		
Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	4	2	6
Duration:	3	2	3	2	1
Extent:	3	3	3	3	2
Irreplaceable:	2	1	2	1	2

Reversibility:	2	2	2	2	2
Probability:	2	2	2	2	4
Total SP:	32	24	28	20	52
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)
Proposed Mitigation:	<ul style="list-style-type: none"> • Ensure that low-, medium- and high skilled workers working at the farm are given advance notice in terms of the decommissioning. • Assist Low-, medium- and high skilled worker in finding other possible vacancies. 				

9.5 CUMULATIVE IMPACTS

The surrounding area is still under natural veld conditions rendering the cumulative impacts of the project less significant. The identified impacts together with their cumulative effects have been discussed under heading 9.4.

The cumulative effects of most of the identified impacts are regarded as low - medium. The only impacts which could potentially cumulatively contribute to more significant combined effects are the transformation of the relevant vegetation type.

9.6 PREFERRED ALTERNATIVE CONCLUDING STATEMENT

In identifying, evaluating and comparing impacts associated with the proposed pivot establishment and considered alternatives as well as financial and logistic feasibility, it has been concluded that both alternative one and two are viable for the proposed development.

10. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The processes of investigation which have led to the production of this report, harbours several **assumptions**, which include the following:

- All information provided by the applicant and his/her assistants to the environmental team was correct and valid at the time that it was provided;
- Strategic level investigations undertaken by the agricultural specialist upon instruction from the applicant prior to the commencement of the EIA process, determined that the development site represents a potentially suitable and technically acceptable location;
- The public received a fair and sufficient opportunity to participate in the Scoping process, through the provision of adequate public participation timeframes stipulated in the Regulations;
- The need and desirability was based on strategic national, provincial and local plans and policies which reflect the interests of both statutory and public viewpoints;
- The information provided by specialists is accurate and unbiased;
- The Scoping process is a project-level framework and is limited to assessing the anticipated environmental impacts associated with the construction and operational phases of the proposed facility
- Strategic level decision making is conducted through cooperative governance principles with the consideration of sustainable and responsible development principles underpinning all decision making.

Given that an EIA involves prediction, **uncertainty** forms an integral part of the process. Two types of uncertainty are associated with the EIA process, namely process-related and prediction-related.

- Uncertainty of prediction is critical at the data collection phase as final certainty will only be obtained upon implementation of the proposed development. Adequate research, experience and expertise may minimise this uncertainty;
- Uncertainty of values depicts the approach assumed during the Scoping process, while final certainty will be determined at the time of decision making. Enhanced communication and widespread/comprehensive coordination can lower uncertainty;
- Uncertainty of related decision relates to the interpretation and decision making aspect of the EIA process, which shall be appeased once monitoring of the project phases is undertaken.

The significance/importance of widespread/comprehensive consultation towards minimising the risk/possibility of omitting significant impacts is further stressed. The use of quantitative impact significance

rating formulas (as utilised in this document) can further standardise the interpretation of results and limit the occurrence and scale of uncertainty.

Gaps in knowledge can be attributed to:

The EIA process is being undertaken prior to the availing of certain information which would be derived from the final project design and layout. As such, technical aspects included herein are mainly derived through personal communication with the applicant and the project manager.

The potential impacts of the cultivation induced soil hydrology and fertility changes on the protected species individuals which are not removed from site is also uncertain to a degree. It is envisaged that an adequate buffer should minimise the risk of such changes potentially impacting on the longevity of these protected individuals.

The principle of human nature also provides for uncertainties with regards to the identified socio-economic impacts of the proposed development.

Eco-Con Environmental is an independent environmental consulting firm and as such, all processes and attributes of the EIA are addressed in a fair and unbiased/objective manner. It is believed that through the running of a transparent and participatory process, risks associated with assumptions, uncertainties and gaps in knowledge can be and have been acceptably reduced.

11. PROFESSIONAL OPINION OF THE EAP AND ENVIRONMENTAL IMPACT STATEMENT

11.1 PROFESSIONAL OPINION OF THE EAP

After careful consideration of the findings and outcomes during both the Scoping and Impact Assessment phases of the project, Eco-Con Environmental is of the opinion that no fatal flaws have been detected and that both alternative one and alternative two are viable for consideration. The EAP is of the professional opinion that alternative one may be approved for development and strongly recommend an approval of the impact assessment report.

11.2 PRELIMINARY ENVIRONMENTAL IMPACT STATEMENT

The key findings of the Impact Assessment phase can be summarised as follows:

The Receiving Environment

The surrounding area is mainly characterised by farming activities and natural veld. Although the proposed project area is of ecological significance due to the presence of nationally and provincially protected species, the potential impacts can be mitigated to acceptable levels. The proposed project area is currently regarded as being of little economic or heritage significance/value according to the results of the various specialist reports. The proposed project also poses significant potential local socio-economic benefits which, according to the EAP, may outweigh the potential negative impacts.

Public Participation

To support public interest and inform the Scoping & EIA process, a continual public consultation process was undertaken throughout the duration of the assessment processes. A diverse mix of authorities, stakeholders and I & AP's was consulted during this time, representing the environment, social, economic and political sectors of local, regional and provincial bodies.

Comments were responded to during various stages of the public participation process in the Scoping & EIA phases and was formally addressed in project reports. It is considered that through the public participation conducted by the EAP, all relevant parties had adequate opportunity to partake in this process and express opinions and concerns. All relevant concerns were adequately addressed to ensure that all parties are in agreement with the proposed project.

12. CONCLUSION

It is in the opinion of the EAP that the only significant potential ecological impact identified and which cannot necessarily be suitably reduced and mitigated to within acceptable levels, is the removal of a significant number of tree/shrub individuals of the nationally protected species *Vachellia haematoxylon*. This potential ecological impact scored a slightly higher risk rating for Alternative 1 (preferred) than for Alternative 2 due to the additional approximate 19 ha footprint. The rest of the potential impacts identified can be suitably reduced and mitigated to within acceptable levels and the project should therefore be considered by the competent authority for environmental authorisation and approval.

Although Alternative 1 (preferred) scored a slightly higher risk rating than Alternative 2, the difference in impact is not deemed significant due to the small relative increase in transformed footprint. Either of the alternatives can therefore be considered by the competent authority.

A period of 30 days was made available for public comment on the draft Impact Assessment Report. The availability of the draft Impact Assessment Report was announced through the placing of hardcopies at different locations, email correspondence and hard copy delivery to relevant stakeholders and organs of state. In addition, a downloadable version was made available on the Eco-Con Environmental website: <http://www.eco-con.co.za/projects/> under the name Secundis Beleggings Agricultural Development.

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