DRAFT ENVIRONMENTAL IMPACT REPORT

Proposed cultivation of 217 ha virgin soil for the establishment of Grazing Pastures and associated water pipeline on the Farm Bultfontein No. 327 near Prieska, Northern Cape Province

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EXECUTIVE SUMMARY

The company Nyama Yethu Holdings (Pty) Ltd. is proposing to commence with the process of procuring the Farm Bultfontein No. 327 near the town of Prieska in the Northern Cape Province (214 ha). The reason for the intended procurement is for establishing grazing pastures on the farm of natural previously uncultivated land.

Eco-Con Environmental (Pty) Ltd. was appointed by Nyama Yethu Holdings (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. 327 Listing Notice 1	**Activity 12** The development of – (i) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs – (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	An approximately 5 km pipeline with a diameter ranging between 250 mm – 500mm will be constructed to transport water from the extraction point in the Orange River. Sections of this pipeline (covering more than 100 square metres) will be constructed through and within 32 metres of existing watercourses.
GN. R. 327 Listing Notice 1	**Activity 19** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The additional pumping and piping infrastructure required to be installed for the proposed project at the water extraction point in the Orange River could potentially trigger this activity.
GN. R. 325 Listing Notice 2	**Activity 13** The physical alteration of virgin soil to agriculture, or afforestation for the	Approximately 217 ha of natural vegetation will be altered for the cultivation and

Regulation	Activity	Description of trigger activity in proposed project
	purposes of commercial tree, timber or wood production of 100 hectares or more.	development of grazing pastures. The total size of the farm portion to be impacted by the establishment of grazing pastures and associated infrastructure of the proposed project is approximately 215 ha (grazing pastures as well as pipeline construction).
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.	Approximately 217 ha of natural vegetation will be altered for the cultivation and development of grazing pastures. The total size of the farm portion to be impacted by the establishment of grazing pastures and associated infrastructure of the proposed project is approximately 215 ha (grazing pastures as well as pipeline construction).
GN. R. 324 Listing Notice 3	**Activity 12** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with the maintenance management plan. (G) In Northern Cape: (ii) Within critical biodiversity areas identified in bioregional plans	The additional pumping and piping infrastructure required to be installed for the proposed project at the water extraction point in the Orange River could potentially trigger this activity.
GN. R. 324 Listing Notice 3	**Activity 14** The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs— (A) Within a watercourse- In Northern Cape	The additional pumping and piping infrastructure required to be installed for the proposed project at the water extraction point in the Orange River could exceed 10 m² in size.

Regulation	Activity	Description of trigger activity in proposed project
	(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional Plans	

PROJECT LOCATION

The proposed project area, deemed as suitable after the various specialist studies is approximately 217 ha in surface size and is situated on Portion 1 of Farm Bultfontein327(SG 21 Digit Code:C03100000000032700001) and Portion 2 of the Farm Folmink 331 (SG 21 Digit Code: C03100000000033100002) extending approximately 1850 ha. The proposed pump station is situated on Portion 1 of the Farm Bultfontein no 327 (SG 21 Digit Code:C03100000000032700001) whilst the proposed water pipeline route traverses the same farm portion. The farm is located approximately 40km north-west of the town of Prieska towards Marydale. The property falls inside the Siyathemba 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 383 provincial road and subsequent dirt roads from the north-west.

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 Northern Cape province of South Africa can be described as a large dry region with similar weather to desert and semi-desert areas. This poses various difficulties for livestock farmers since they are dependent on rain in order to provide their livestock with sufficient grazing. The cultivation of grazing pastures will thus enable farmers to effectively farm livestock. The remaining area of the Farm Bultfontein 327 is currently of little economic value due to low grazing capacity for livestock purposes. Should these suitable areas not be developed and efficiently utilised, the economic value will stay low. The development of grazing pastures 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 Siyathemba Local Municipality and Pixley Ka Seme District Municipality Integrated Development Plans.

ALTERNATIVES CONSIDERED

Site / Property Alternatives

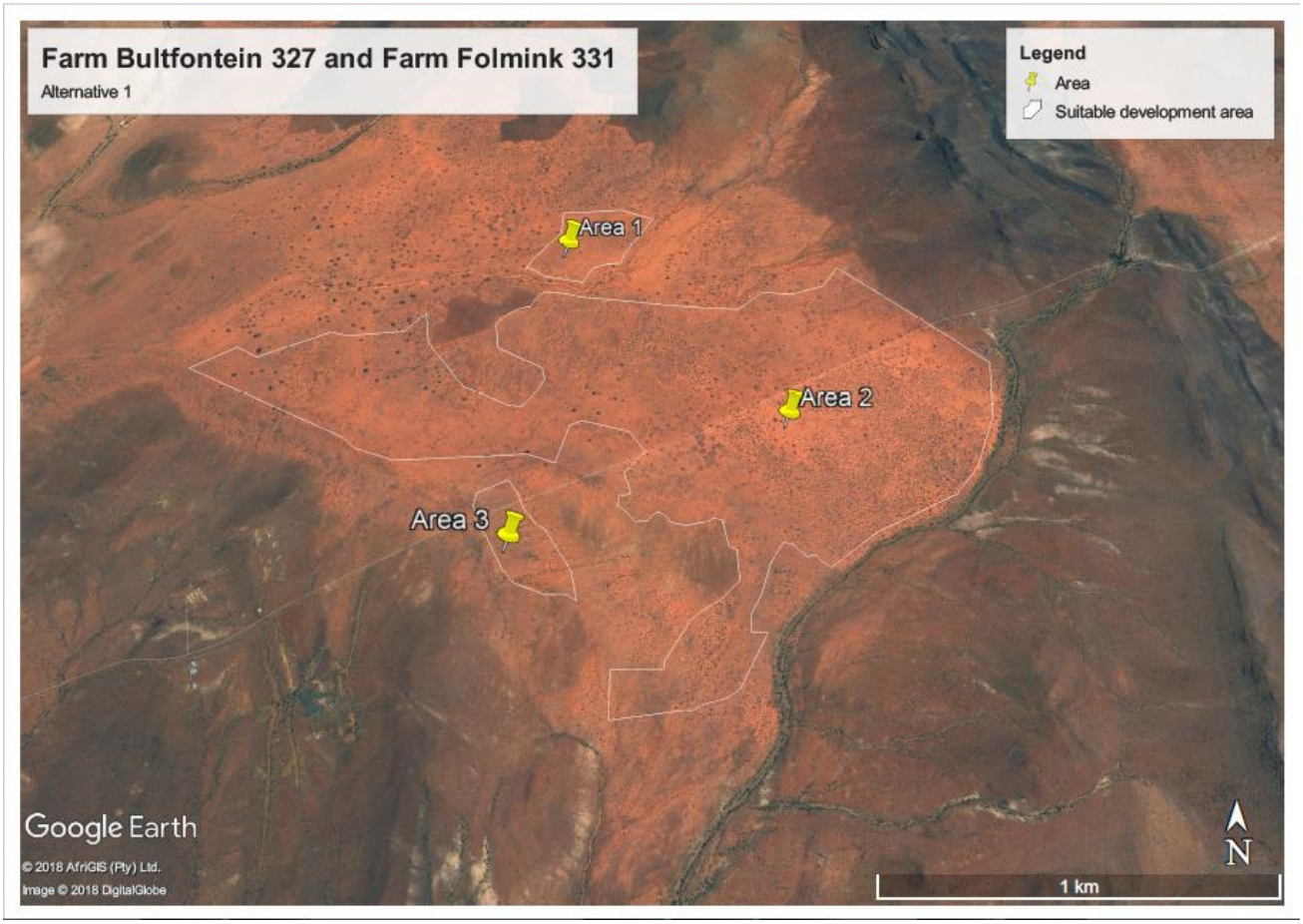
An alternative viable site location was not identified and evaluated for the project. The specific proposed location for said project is preferred as it is the only viable portion of land available in that vicinity which is up for procurement. The landowner and the applicants is the same person / company and therefore Procurements arrangements will not have to be made. The portions up for development is also situated on the most suitable area of the farms due to their favourable topography and location from the Orange River from where water will be obtained for irrigation. This will render the project viable from an economic and logistic perspective.

Layout Alternatives

The assessment area is approximately 535 ha in size and is in a natural pristine condition. Two layout alternatives are proposed which constitute ecologically and agriculturally suitable areas for the development and are summarised below:

Layout Alternative 1 (Preferred Layout Alternative)

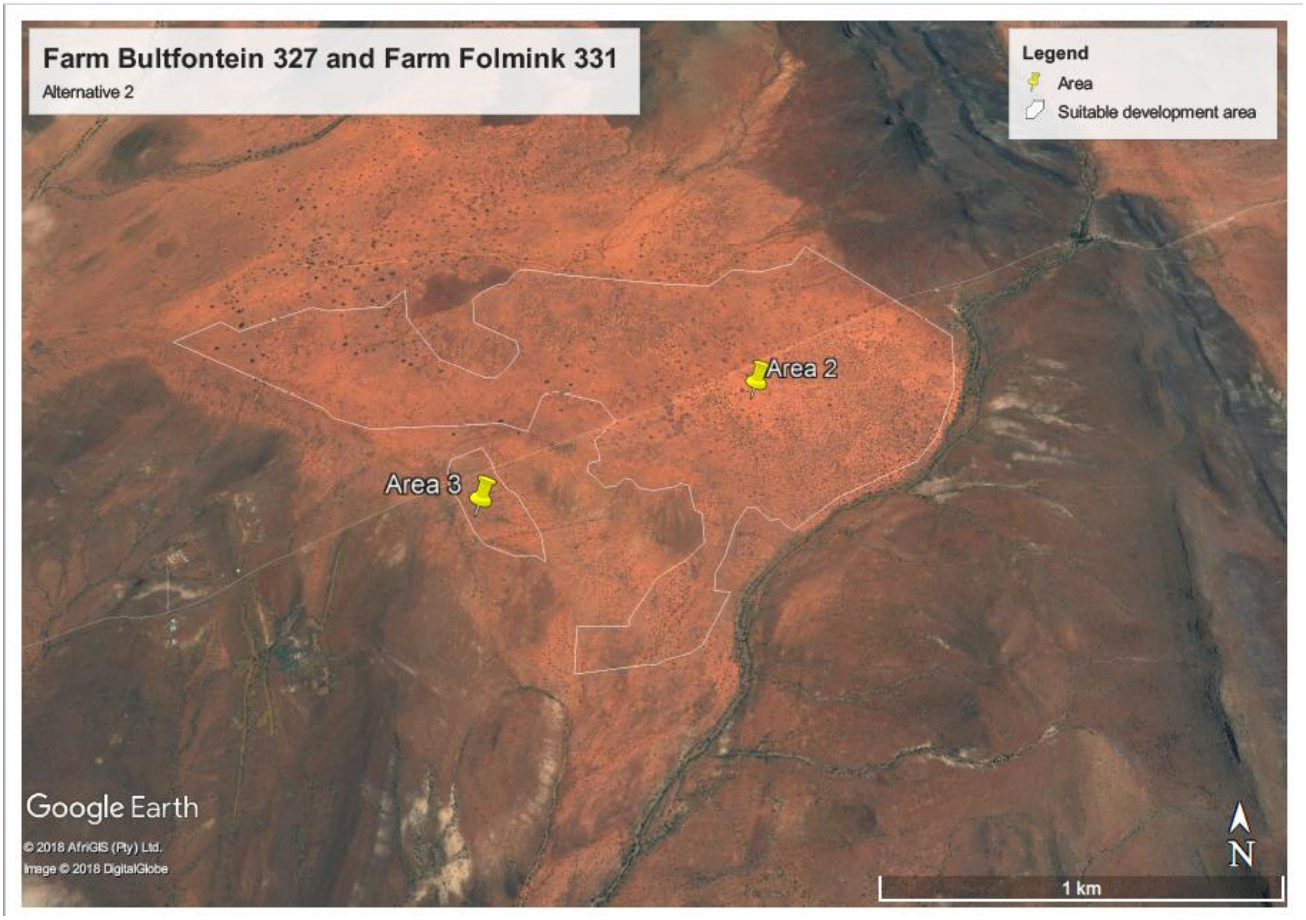
The preferred layout alternative includes three separate areas. Areas 1, 2 and 3 are 11.2 ha; 199 ha and 7,34 ha in size respectively. The total development area of this alternative equates to 217 ha. Smaller, temporary camps will then be laid out within the larger areas and grazed by means of a rotational system. These camps will then be irrigated by a pivot irrigation system.



Farm Bultfontein 327 and Farm Folmink 331 Alternative 1 (Preferred Alternative)

Layout Alternative 2

This layout alternative includes two separate areas. Areas 2 and 3 are 199 and 7,34 ha in size respectively. The total development area of this alternative equates to 210 ha. Smaller, temporary camps will then be laid out within the larger areas and grazed by means of a rotational system. These camps will then be irrigated by using a pivot irrigation system.



Bultfontein 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 comments received during the scoping phase of the project, is listed under Table 11

ENVIRONMENTAL IMPACT ASSESSMENT

Planning, Design and Construction Phase

PLANNING, DESIGN AND CONSTRUCTION PHASE							
Potential Flora Impacts:							
Nature of impact: Transformation of terrestrial vegetation on the assessment area associated with the Northern Upper Karoo (NKu 3) and Lower Gariep Broken Veld (NKb 1) vegetation types				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	72	60	72	60	39	24	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Nature of impact: Transformation of a Critical Biodiversity Area one (CBA 1) and Ecological Support Area (ESA) associated with the assessment area				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	0	0	0	0	54	48	14
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Medium (M)	Medium (M)	Low (L)
Nature of impact: Destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	110	51	110	51	51	27	14
Significance rating:	High (H)	Medium (M)	High (H)	Medium (M)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Nature of impact: Terrestrial alien invasive species establishment				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	64	26	64	26	56	22	14

Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Fauna and Avifauna Impacts:							
Nature of impact: Direct impact on Fauna and Avifauna as a result of vegetation clearance.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	68	60	68	60	51	45	7
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	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 forage crops.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	56	22	56	22	48	18	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Noise Impacts:							
Nature of impact: Noise nuisance generated during the development / preparation of the forage crops.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential cultural and heritage impacts							
Nature of impact: Damage and destruction of vertebrate fossils during excavation activities.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	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 cultivated lands – especially the impeding and contamination of the flow regimes of the significant ephemeral watercourses			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	84	26	84	26	76	26	0
Significance rating:	Medium High (M)	Low (L)	Medium High (M)	Low (L)	Medium High (M)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Waste Management Impacts:							
Nature of impact: Waste impacts by means of waste storage and littering during the development / preparation of the cultivated lands.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	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 cultivated lands.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 cultivated lands.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	9	6	9	6	9	6	4

Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	14	3	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	48	20	48	20	42	20	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Potential Visual Impacts:							
Nature of impact: Increased visual impact due to increased working activities on-site.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	14	3	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	52	75	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)

Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)

Operational Phase

OPERATIONAL PHASE							
Potential Flora Impacts:							
Nature of impact: Direct impact on flora as a result of continuous vegetation clearance.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	51	48	45	42	39	36	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Fauna and Avifauna Impacts:							
Nature of impact: Continuous impact on Fauna and Avifauna as a result of cleared vegetation / habitat loss.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	51	48	45	42	39	36	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Dust Impacts:							
Nature of impact: Dust nuisance generated during the operational phase of the project.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	60	22	60	22	24	18	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Noise Impacts:							
Nature of impact: Noise nuisance generated during the operational phase of the forage crop establishment.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	24	18	24	18	24	18	16

Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
POTENTIAL CULTURAL AND HERITAGE IMPACTS							
Nature of impact: Damage and destruction of vertebrate fossils during the operational phase.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	7	6	7	6	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:							
Nature of impact: Surface and Groundwater Contaminationduring the operational phase by means of fertilizer and/or any other hazardous substances or pesticides specifically the continued impeding and contamination of the flow regimes of the significant ephemeral watercourses			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	88	26	88	26	80	26	0
Significance rating:	Medium High (MH)	Low (L)	Medium High (MH)	Low (L)	Medium High (MH)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 cultivated lands .			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	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 cultivated lands.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	

Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 cultivated lands .				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	7	6	7	6	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	84	26	84	26	7	4	4
Significance rating:	Medium High (MH)	Low (L)	Medium High (MH)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Soil Erosion Impacts:							
Nature of impact: Increased Soil erosion due to operational activities.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	20	6	20	6	20	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	14	3	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	52	75	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)

Decommissioning Phase

DECOMMISIONING PHASE							
Potential Dust Impacts:							
Nature of impact: Dust nuisance generated during the decommissioning phase of the project.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	24	18	20	14	16	14	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:							
Nature of impact: Surface and Groundwater Contaminationduring the decommissioning phase by means of fertilizer and/or any other hazardous substances or pesticides.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	7	4	7	4	7	4	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 cultivated lands .				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	

Total SP:	6	6	6	6	6	6	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	7	4	7	4	7	4	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	26	9	22	7	18	7	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Potential Socio-Economic Impacts:							
Nature of impact: Decreased socio-economic conditions due to job loss				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Total SP:	32	24	28	20	24	20	52
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)
Cumulative impact:	Low (L)	Low (L)	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

The mechanical clearance and soil preparation associated with the proposed agricultural development will in all probability completely transform the majority of the existing surface vegetation on the assessment area.

Both the Northern Upper Karoo (NKu 3) and Lower Gariep Broken Veld (NKb 1) vegetation types associated with the assessment area, are classified as least threatened as very little has been transformed thus far (SANBI, 2006-). The majority of the assessment area as well as the entire pipeline route is further categorised as 'Other Natural Area' (ONA) while only a very small portion in the south-eastern corner of the assessment area falls within an Ecological Support Area (ESA) in accordance with the NCPSBP, which sets out biodiversity priority areas in the province. The location of the pump station on the banks of the Orange River falls within a Critical Biodiversity Area one (CBA 1) in accordance with the NCPSBP.

The assessment area is in a natural pristine condition and scored a very high PES value. The broader areas surrounding the assessment area, which are associated with the relevant vegetation types, are extremely vast and also largely natural and undeveloped. The size of the proposed development is therefore small relative to the surrounding natural region.

Although no Red Data Listed species of conservational significance were found to be present within the assessment area, the provincially protected species *Euphorbia burmannii* & *Aloe claviflora* were encountered within the rocky ridge outcrops. It is therefore recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible. It is also expected that the assessment area will house a number of provincially protected bulb species. It is therefore further recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulb plant species. This will ensure that no provincially protected or significant species have potentially been omitted.

Furthermore, tree and shrub individuals of the nationally protected species *Boscia albitrunca* & *Vachelli aerioloba* are sparsely scattered throughout the southern and central portions of the assessment area. Approximately ≤ 85 *Boscia albitrunca* individuals and ≤ 180 *Vachelli aerioloba*individuals are present within these southern and central portions. The majority of individuals of the latter species are however still relatively small (≤ 3.5 m in height) within the southern and central portions.

The densities of these two nationally protected species however increase significantly within the northern portion of the assessment area and a high number of large mature individuals (≥ 7 m in height) of the species *Vachelli aerioloba* are present there. Approximately ≤ 200 *Boscia albitrunca* individuals and ≤ 450 *Vachelli aerioloba* individuals are present within the northern portion. Due to the presence of this well-established woody component within the northern portion, the area subsequently also houses numerous large congregated nests of sociable weavers (*Philetairussocius*) which is a provincially protected species. The area is also utilised by various raptor- and other predatory bird species for breeding, foraging and persistence purposes. The northern portion of the assessment area is therefore viewed as being of relatively high

conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and nationally protected tree species.

Due to the significant presence of the two nationally protected tree species within the northern portion of the assessment area, together with the area's distinctly associated avifaunal ecology, it is recommended that a theoretical development line must be drawn through the assessment area and no development should be allowed to take place north of this line. If development north of the line is still considered by the applicant, it would highly likely require the investigation and implementation of a suitable Biodiversity Offset as part of the NEMA mitigation hierarchy. A comprehensive Biodiversity Offset Feasibility Assessment and Report would therefore need to be conducted and compiled in order to identify and inform on potential areas of suitable size and similar ecological value which could meaningfully contribute to the provincial and national biodiversity targets and conservation strategies. The proposed Biodiversity Offset Feasibility Assessment and Report will have to be evaluated by the relevant competent authorities in order to inform on their approval/rejection process. It is recommended that the Department of Agriculture, Forestry and Fisheries be informed of the application as an Interested & Affected Party during the Public Participation Process in order for them to provide comment and recommendations in this regard.

Although the additional approximately 11.2 ha portion associated with Alternative 1 is situated north of the recommended development line, the location of this additional portion has specifically been chosen in an area with a lower tree density and few large mature individuals of the species *Vachelli aerioloba* (≤ 15) relative to the rest of the area north of the development line. The development within this additional portion will therefore not result in the removal of a significant number of nationally protected tree individuals and should not necessarily impact significantly on the continued ecological functionality and connectivity of the broader ecosystem north of the development line.

Individuals of the two nationally protected tree species are also sparsely scattered along the pipeline route. No individuals of the two nationally protected tree species are to be removed during the pipeline construction phase and the pipeline route is to be diverted around any individuals of these two species if encountered.

The ephemeral watercourses which traverse the assessment area, form an important part of the mid to upper region of a quaternary surface water catchment and drainage area which regionally drains towards the south and eventually discharges into the Orange River situated approximately 3.2 km south of the assessment area. The ephemeral watercourses are therefore viewed as being of relatively high conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and the surface water catchment and drainage area. It is therefore recommended

that the ephemeral watercourses be adequately buffered out of the proposed development footprint and that no significant development is allowed to take place within the buffer zone.

A significant number of small drainage lines feed into the directly adjacent ephemeral watercourse all along the length of the proposed pipeline route. The local catchment and drainage all along the length of the pipeline route towards the ephemeral watercourse, could therefore be significantly impeded by the construction of the aboveground pipeline. Construction and design of the proposed pipeline should take into account the significant number of small drainage lines and the pipeline must be installed in a manner so as not to permanently impact or impede on the local surface water drainage towards the ephemeral watercourse.

It is the opinion of the specialist that the potentially significant ecological impacts associated with the contamination and impeding of the flow regimes of the significant ephemeral watercourses as well as destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area, can be suitably reduced and mitigated to within acceptable residual levels. The project should therefore be considered by the competent authority for environmental authorisation and approval.

Although Alternative 2 will result in the transformation of an approximately 11.2 ha smaller footprint area (total of 206.34 ha) relative to Alternative 1 (total of 217.54 ha), there is no significant difference in ecological impact ratings between the two alternatives. It is recommended that Alternative 2 rather be considered due to its slightly smaller impact footprint but either alternatives should prove to be acceptable for development.

Heritage Specialist study

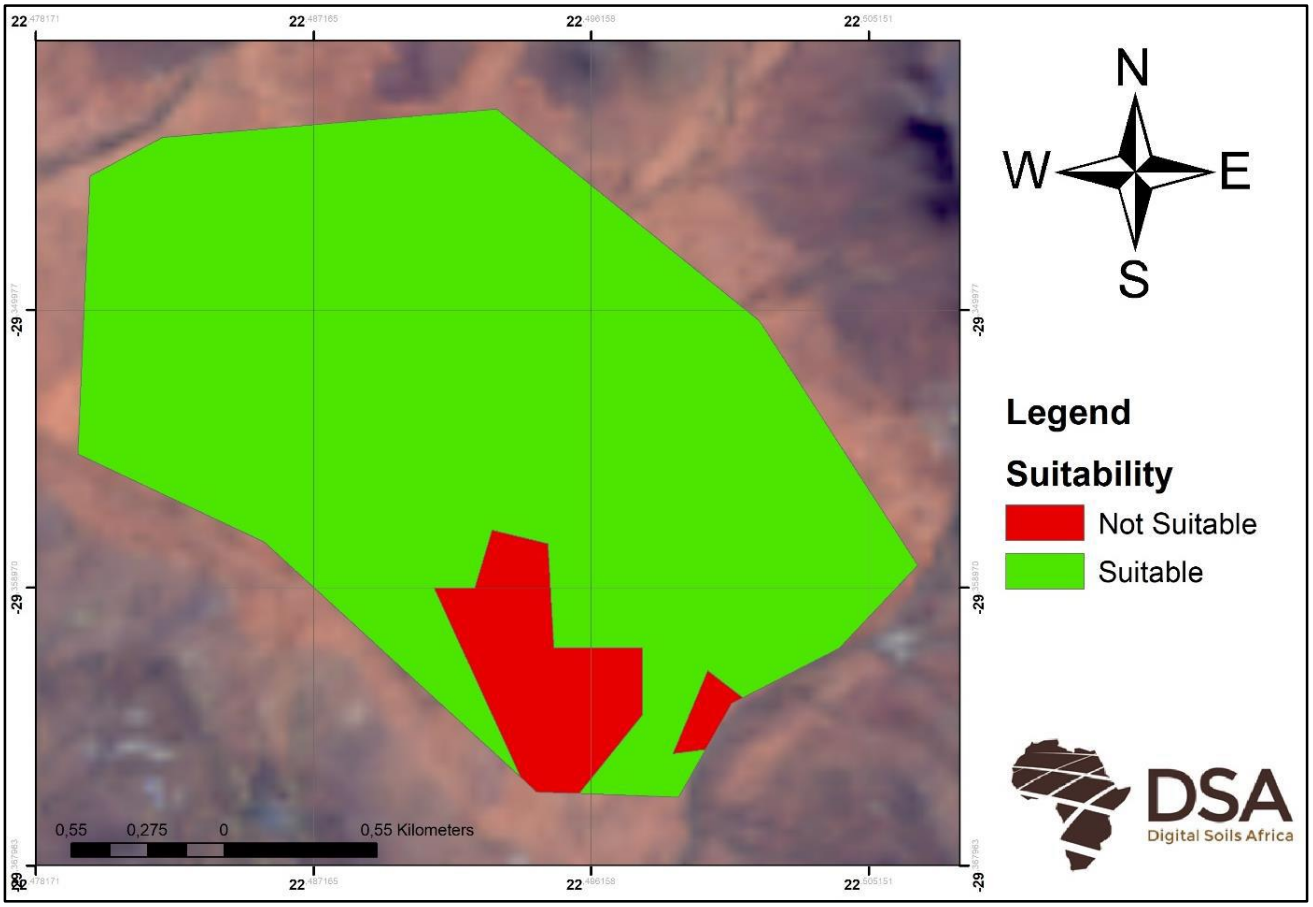
A Phase 1 Heritage Impact Assessment was carried out on the farm Bultfontein 327 situated near Prieska in the Northern Cape Province, as part of an application for agricultural development. Vaalian aged basement rocks within the affected area (Ghaap Group, Transvaal Supergroup) are covered in places by well-developed superficial sediments made up of basin -accumulated Quaternary wind-blown sand deposits, variable clasts of surface gravels, and reworked calcretes. Results from a foot survey of the lower valley fills near the Orange River (pipeline and pump station) as well as upland areas (pipeline and agricultural area) show no evidence of above-ground, *in situ* Stone Age archaeological sites. There are also no indications of rock art, prehistoric structures, graves or historically significant structures older than 60 years within the areas that were surveyed. Given the nature and scale of the proposed development the development footprint is not considered to be palaeontologically or archaeologically vulnerable. The survey area is assigned a rating of Generally Protected C (GP.C). The development can proceed provided that activities are confined to the proposed footprint.

Soil Suitability Study

On the Remaining Extent of the farm Bultfontein No. 327, the Hutton soil form covers the largest part of the site, but gives way to Plooysburg, and Glenrosa soils in the south. Small parts of the Mispah soil form is also present near the middle of the site.

The freely drainable depth is the depth up to where the water can freely drain. It includes the depth of the lithocutanic B. The drainable depth is the same as the freely drained depth, with the exception of 200 mm added when a soft carbonate is the limiting layer, to accommodate potential infiltration into the soft carbonate horizon and shows the depth at which artificial drainage can be installed. For this, 300 mm below the depth of the lithocutanic B was added, if hard rock was not yet encountered. The soils of the site are generally deep, often no limiting layer was reached. Towards the south the soils are shallower, with hardpan carbonate accumulation. There are small areas, easily distinguishable in the field, where shallow soils occur, which must be omitted from irrigation.

Based on soil morphology and laboratory analysis, the following areas are considered suitable for irrigation. For ease of monitoring, the areas are created in right shapes as seen on the image below.



Suitable Irrigation soil at Bultfontein

CONCLUSION

It is the opinion of the EAP that the potentially significant ecological impacts associated with the contamination and impeding of the flow regimes of the significant ephemeral watercourses as well as destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area, can be suitably reduced and mitigated to within acceptable residual levels. The project should therefore be considered by the competent authority for environmental authorisation and approval.

Although Alternative 2 will result in the transformation of an approximately 11.2 ha smaller footprint area (total of 206.34 ha) relative to Alternative 1 (total of 217.54 ha), there is no significant difference in ecological impact ratings between the two alternatives. It is recommended that Alternative 2 rather be considered due to its slightly smaller impact footprint but either alternatives should prove to be acceptable for development.

TABLE OF CONTENT

List of Figures ..... **xxiv**

List of Tables ..... **i**

Abbreviations ..... **iii**

1. Introduction **1**

1.1 Project applicant information 1

2. Environmental Assessment Practitioner **3**

2.1 Details of the EAP 3

2.2 Expertise of the EAP Representative 4

2.3 Public Participation Officer 8

3. Relevant Environmental Legislation and Guidelines **9**

3.1 Constitution of the Republic of South Africa (Act 108 of 1996) 9

3.2 Other relevant environmental legislation 9

3.2.1 National 9

3.2.2 Provincial 13

3.2.3 District and Local 14

3.3 Relevant Guidelines 15

3.4 NEMA Listed Activities Triggered by the Proposed Project 16

3.5 NEMA Regulation 23 Impact Assessment Report information compliance 18

4. Project Location and Description **22**

4.1 Project Location 22

4.2 Project Description 28

4.2.1 Construction of a pipeline and water extraction point in the Orange River. 30

4.2.2 Cultivation of 214 ha Grazing Pastures. 32

4.2.3 Project Description Summary 33

4.3 Project services 33

4.3.1 Electricity Supply 33

4.3.2 Sewage Management 33

4.3.3 Solid Waste Management 33

4.3.4 Water Supply 34

5. Needs and Desirability of the Project **35**

5.2 additional motivation with specific reference to free range farming 36

5.3 job creation $ socio-economic conditions 39

6. Alternatives Considered **40**

6.1 Location Alternatives 41
6.2 Layout Alternatives 41
6.3 No-Go Option 43
7. Description of the Environment 44
7.1 Bio-Physical Description 44
7.1.1 Climate 44
7.1.2 Geology and Soils 44
7.1.3 Topography 45
7.1.4 Ecological and Vegetation Conservation Status 45
7.1.5 Agriculture and Soil Suitability Assessment 60
7.1.6 Heritage 63
7.2 Socio-Economic Description 64
8. Public Participation Process 67
8.1 Scoping Phase Public Participation 67
8.1.1 Comments received and responses provided during the Scoping phase 68
8.2 Environmental Impact Assessment Phase 72
8.3 List of Stakeholders / Organs of state / Landowners and Adjacent landowners notified 73
8.4 Comments and Responses 74
9. Environmental Impact Assessment 75
9.1 Methodology for Impact Assessment and Risk Rating 75
9.2 Description of Potential Impacts and their Recommended Mitigation Measures 78
9.2.1 Construction Phase 78
9.2.2 Operational Phase 85
9.2.3 Decommissioning Phase 90
9.3 Risk Ratings of Potential Impacts 93
9.4 Impact Assessment 94
9.4.1 Planning, Design and Construction Phase 94
9.4.2 Operational Phase Impacts 108
9.4.3 Decommissioning Phase Impacts 118
9.5 Cumulative Impacts 123
9.6 Preferred Alternative Concluding Statement 123
10. Assumptions, Uncertainties and Gaps in Knowledge 125
11. Professional Opinion of the EAP and Environmental Impact Statement 127
11.1 Professional Opinion of the EAP 127

11.2 Preliminary Environmental Impact Statement 129
12.Conclusion 131
13.References 132

LIST OF FIGURES

Figure 1: Layout Coordinate Points 24
Figure 2: Pipeline coordinate points 24
Figure 3: Image visually illustrating the general vegetation cover 25
Figure 4: Image visually illustrating the general vegetation cover 26
Figure 5: Locality map of the proposed project layout (see Appendix B for an A3 size version) 27
Figure 6: Farm Bultfontein 327 and Farm Folmink 331 Alternative 1 (Preferred Alternative) 29
Figure 7: Farm Bultfontein 327 and Farm Folmink 331 Alternative 2 30
Figure 8: Pipeline route 32
Figure 9: Bultfontein Preferred Alternative (Alternative 1) 42
Figure 10: Bultfontein Alternative 2 43
Figure 11: Vegetation map of the proposed project layout (see Appendix B for an A3 size version) 47
Figure 12: Ecological sensitivity map of the proposed project layout (see Appendix B for an A3 size version) 48
Figure 13: Two images illustrating the open and dense sandy karroid shrubland respectively 50
Figure 14: Two images illustrating the significantly higher density of large mature individuals of the nationally protected species Vachellia erioloba within the northern portions of the assessment area. 52
Figure 15: Two images illustrating the presence of numerous large congregated nests of provincially protected sociable weavers (Philetairussocius) within the northern portions of the assessment area 53
Figure 16: Two images illustrating the increase in exposed soil surface rockiness within the rocky ridge outcrops 55
Figure 17: Two images illustrating the significant ephemeral watercourses which traverse the assessment area. 56
Figure 18: Two images illustrating the small water drainage lines which traverse the assessment area and eventually dissipate into the surrounding sandy karroid shrubland 57
Figure 19: Illustration of soil forms encountered 61
Figure 20: Illustration of infiltration limiting material 61
Figure 21: Illustration of drainable depths 62
Figure 22: Illustration of suitability of the proposed project area 63
Figure 23: Employment Graph for those aged 15-64 65
Figure 24: Economic profile graph indicating household income 65
Figure 25: Education graph indicating education levels 66

LIST OF TABLES

Table 1: Project applicant information 1
Table 2: Details of the EAP 3
Table 3: Applicable guideline documents 16
Table 4: Environmental Impact Assessment Regulations, 2017 listed activities triggered by the proposed project 16
Table 5: Information required in the Impact Assessment Report as per Appendix 3 of GN R. 326 of the EIA Regulations, 2017 18
Table 6: Farm name and Number with SG code and Landowner name 22
Table 7: Details of relevant land owner 25
Table 8: Comparison between nutritional value of grass fed and feedlot fed meat 36
Table 9: List of Specialist Studies Conducted 44
Table 10: soils encountered during the survey 60
Table 11: Comments Received during the 30-day Scoping Phase Public Participation period 69
Table 12: Stakeholders / Organs of State / Organisations / Interested and Affected Parties notified 73
Table 13: Scale utilised for the evaluation of the Environmental Risk Ratings 75
Table 14: Scale used for the evaluation of the Environmental Significance Ratings 77

Content of Appendices

Appendix A – Curriculum Vitae of the EAP

Appendix B – Locality and Sensitivity maps

- Appendix B1 – Locality Map
- Appendix B2 – Sensitivity map - A
- Appendix B3 – Sensitivity map - B
- Appendix B4 – Vegetation Map

Appendix C – Public Participation Report

Appendix D – Declaration of EAP

Appendix E – Specialist Reports

- Appendix E1 – Ecological and Wetland Study
- Appendix E2 – Heritage Study
- Appendix E3 – Soil Suitability Study

Appendix F – Applicant information

- Appendix F1 – Title Deeds
- Appendix F2 – Applicant Declaration

Appendix G – Water Rights Documentation

Appendix H – Photo Report

Appendix I – Environmental Management Plan

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_2e	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 Great Force Investments (Pty) Ltd. is proposing to commence with the development of approximately 217 ha virgin soil into cultivated temporary irrigated camps on Portion 1 of the Farm Bultfontein 327 and Portion 2 of the Farm Folmink 331 near Prieska, Northern Cape Province. The reason for the intended procurement is for establishing grazing pastures on the farm of natural previously uncultivated land. This also includes a pipeline and pump station in order to obtain water from the Orange river for irrigation purposes.

The completion of the farm procurement process is however dependent on a number of factors. The major conditional factors are the suitability of the area for grazing pastures (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 2014 (as amended in April 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 Great Force Investments (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:	**Great Force Investments (Pty) Ltd**
Registration number:	2004/010910/07

Physical address:	17 Wolhuter street, Robertson
Postal address:	P.O. Box 895, 6705, Robertson
Contact person:	Hennie de Bod
ID number:	6304205083082
Designation:	Director
Contact number:	082 881 3191
E-mail address:	hennie@safam.co.za

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1 DETAILS OF THE EAP

Eco-Con Environmental (Pty) Ltd. was appointed by Great Force Investments (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 were 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 Orange 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 Siyathemba Local Municipality Integrated Development Plan 2015/2016

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

Vision

A municipality that cares

Mission

Caring for our communities and stakeholders through:

- Management of negative perceptions within the municipality
- Communicating information with our stakeholders, openly and honestly
- Delivering quality and reliable services to all our communities
- Responsive governance

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	*Draft Guideline on the **Need and Desirability** in terms of the EIA Regulations of 2010*. Integrated Environmental Management Guideline Series 9, Government Notice 792 of 2012.
2	**DEA & DP EIA Guideline and Information Document Series**
2.1	*Guideline on **Generic Terms of Reference for EAPs and Project Schedules***, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning, March 2013.
2.2	*Guideline on **Need and Desirability**, EIA Guideline and Information Document Series*. Western Cape Department of Environmental Affairs & Development Planning, March 2013.
2.3	*Guideline on **Alternatives**, EIA Guideline and Information Document Series.* Western Cape Department of Environmental Affairs & Development Planning, March 2013.
2.4	*Guideline on **Public Participation**, 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	*Guideline for **Environmental Management Plans***. 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. 327 Listing Notice 1	**Activity 12** The development of – (ii) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs – (b) within a watercourse;	An approximately 5 km pipeline with a diameter ranging between 250 mm – 500mm will be constructed to transport water from the extraction point in the Orange River. Sections of this pipeline (covering more than 100 square metres) will be

Regulation	Activity	Description of trigger activity in proposed project
	(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	constructed through and within 32 metres of existing watercourses.
GN. R. 327 Listing Notice 1	**Activity 19** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The additional pumping and piping infrastructure required to be installed for the proposed project at the water extraction point in the Orange River could potentially trigger this activity.
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.	Approximately 217 ha of natural vegetation will be altered for the cultivation and development of grazing pastures. The total size of the farm portion to be impacted by the establishment of grazing pastures and associated infrastructure of the proposed project is approximately 215 ha (grazing pastures as well as pipeline construction).
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.	Approximately 217 ha of natural vegetation will be altered for the cultivation and development of grazing pastures. The total size of the farm portion to be impacted by the establishment of grazing pastures and associated infrastructure of the proposed project is approximately 215 ha (grazing pastures as well as pipeline construction).
GN. R. 324 Listing Notice 3	**Activity 12** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with the maintenance management plan. (G) In Northern Cape:	The additional pumping and piping infrastructure required to be installed for the proposed project at the water extraction point in the Orange River could potentially trigger this activity.

Regulation	Activity	Description of trigger activity in proposed project
	(ii) Within critical biodiversity areas identified in bioregional plans	
GN. R. 324 Listing Notice 3	**Activity 14** The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs— (A) Within a watercourse- In Northern Cape (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional Plans	The additional pumping and piping infrastructure required to be installed for the proposed project at the water extraction point in the Orange River could exceed 10 m² in size.

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 217 ha in surface size and is situated on Portion 1 Farm Bultfontein 327 (SG 21 Digit Code: C03100000000032700001) and Portion 2 of the Farm Folmink 331 (SG 21 Digit Code: C03100000000033100002) extending approximately 1850 ha. The proposed pump station is situated on Portion 1 of the Farm Bultfontein no 327 (SG 21 Digit Code: C03100000000032700001) whilst the proposed water pipeline route traverses the same farm portion. The farm is located approximately 40 km north-west of the town of Prieska towards Marydale. The property is in the name of Great Force Investments (Pty) Ltd, with Mr. Hennie de Bod (the applicant) as the sole director. No consent is thus required.

The property falls inside Siyathemba 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 383 provincial road as the farm is situated directly to the East of the R 383 provincial road.

See locality map below.

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

Farm Name and Number	SG 21 Digit Code	Land owner
Portion 1 of Farm Bultfontein 327	C03100000000032700000	Great Force Investments (Pty) Ltd.
Portion 2 of the Farm Folmink 331	C03100000000033100002	Great Force Investments (Pty) Ltd.

(See Appendix F for the title deeds)

Area 1

- Point 1 29°20'51.18"S; 22°29'31.73"E
- Point 2 29°20'50.47"S; 22°29'40.24"E
- Point 3 29°20'52.40"S; 22°29'44.29"E
- Point 4 29°21'00.03"S; 22°29'39.91"E

- Point 5 29°21'03.50"S; 22°29'34.70"E
- Point 6 29°21'00.83"S; 22°29'26.87"E
- Point 7 29°20'54.82"S; 22°29'31.22"E

Area 2

- Point 1 29°21'5.35"S; 22°29'29.59"E
- Point 2 29°21'1.33"S; 22°30'9.50"E
- Point 3 29°21'17.34"S; 22°30'27.67"E
- Point 4 29°21'44.72"S; 22°30'4.49"E
- Point 5 29°22'0.97"S; 22°29'39.76"E
- Point 6 29°21'39.13"S; 22°29'52.14"E
- Point 7 29°21'29.67"S; 22°29'43.45"E
- Point 8 29°21'28.34"S; 22°29'7.46"E
- Point 9 29°21'14.81"S; 22°28'52.82"E
- Point 10 29°21'20.45"S; 22°29'20.36"E

Area 3

- Point 1 29°21'33.82"S; 22°29'27.07"E
- Point 2 29°21'40.34"S; 22°29'32.26"E
- Point 3 29°21'48.52"S; 22°29'35.74"E
- Point 4 29°21'47.21"S; 22°29'31.15"E
- Point 5 29°21'42.76"S; 22°29'26.32"E
- Point 6 29°21'35.50"S; 22°29'23.22"E

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

- Start point 29°23'26.18"S; 22°28'1.19"E
- Deviation point 1 29°23'20.04"S; 22°28'4.80"E
- Deviation point 2 29°23'8.41"S; 22°28'4.85"E
- Deviation point 3 29°22'59.06"S; 22°28'6.96"E
- Deviation point 4 29°22'52.33"S; 22°28'12.39"E
- Deviation point 5 29°22'42.66"S; 22°28'9.98"E
- Deviation point 6 29°22'30.94"S; 22°28'16.68"E
- Deviation point 7 29°22'12.96"S; 22°28'20.86"E
- Deviation point 8 29°21'57.95"S; 22°28'34.17"E

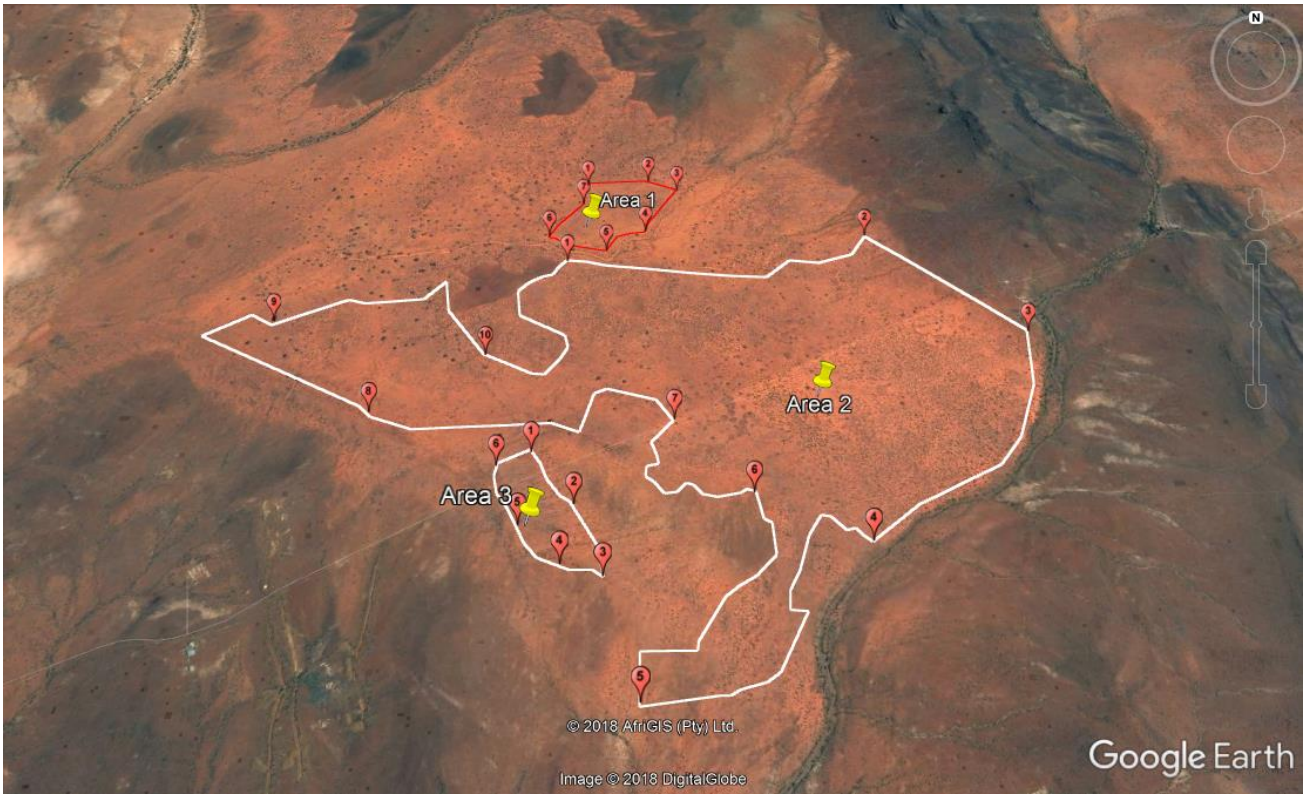


Figure 1: Layout Coordinate Points

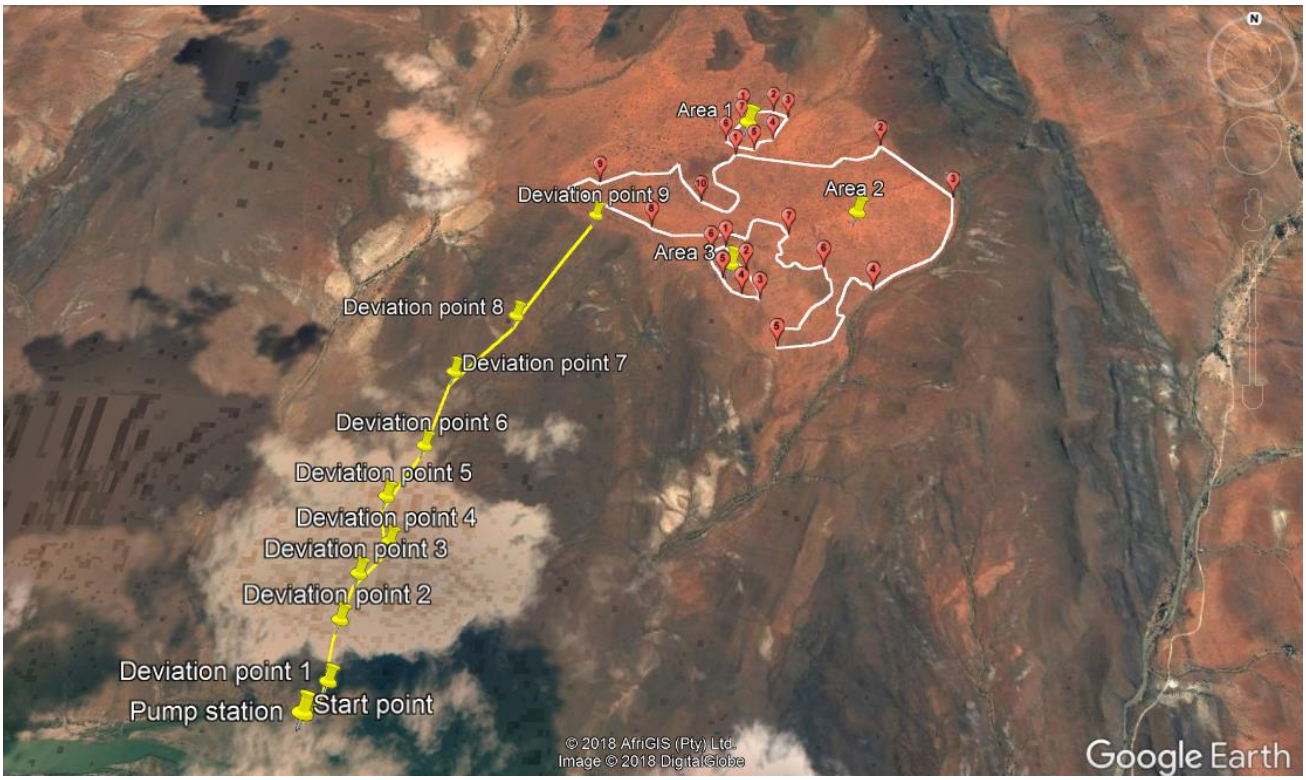


Figure 2: Pipeline coordinate points

Table 7: Details of relevant land owner

Company/entity name:	Great Force Investments (Pty) Ltd.
Postal address:	P.O. Box 895, Robertson, 6705
Contact person:	Hennie de Bod
Designation:	Director
Contact number:	082 881 3191
E-mail address:	hennie@safam.co.za

A visual illustration of the proposed project area is provided in Figures 3 & 4 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 5 below:

Figure 3: Image visually illustrating the general vegetation cover

Figure 4: Image visually illustrating the general vegetation cover

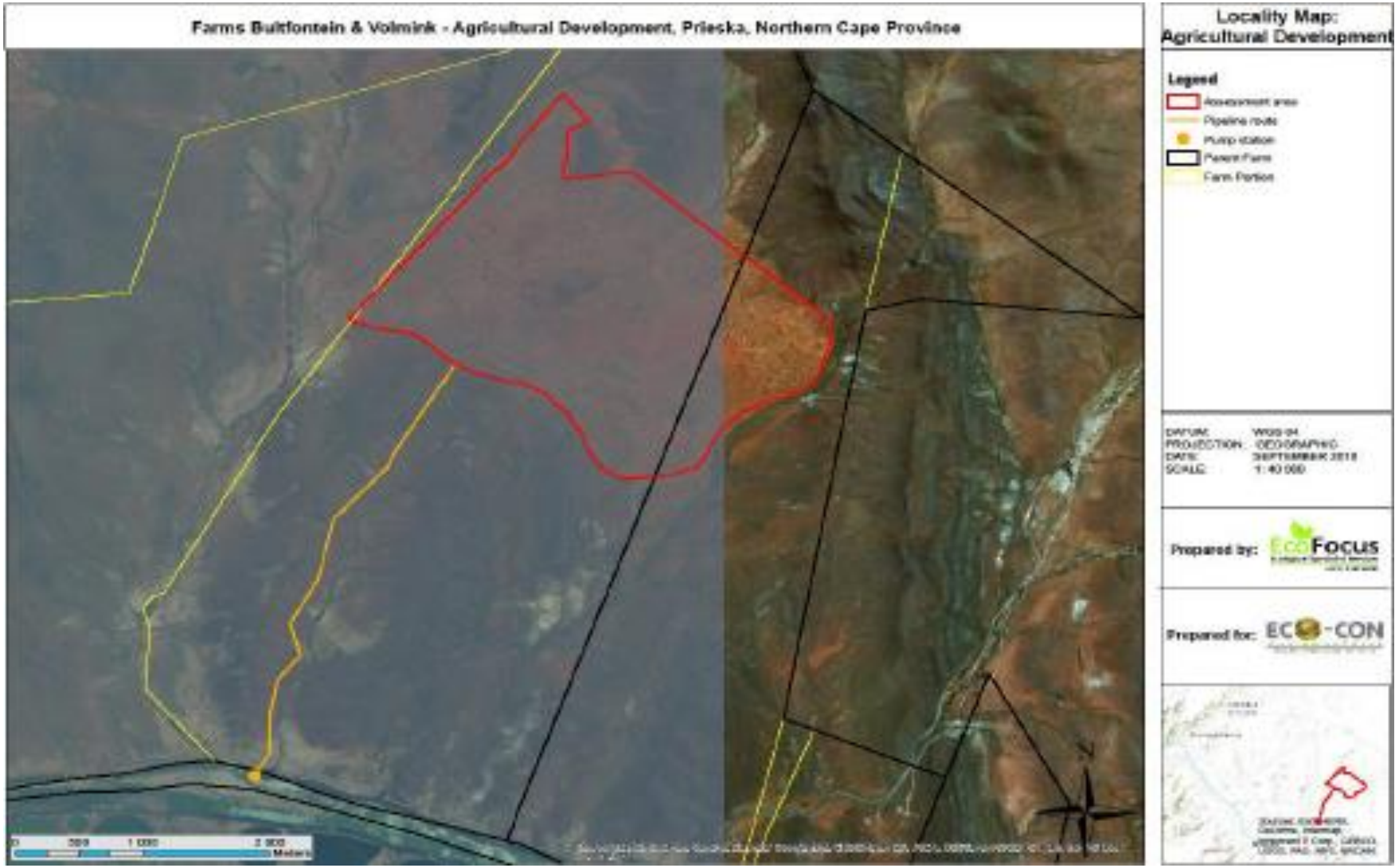


Figure 5: Locality map of the proposed project layout (see Appendix B for an A3 size version)

4.2 PROJECT DESCRIPTION

The company Great Force Investments (Pty) Ltd. is proposing to commence with the process of procuring the Farm Bultfontein No. 327 as well as Portion 2 of the Farm Folmink 331 near the town of Prieska in the Northern Cape Province (217 ha). The reason for the intended procurement is for establishing grazing pastures on the farm of natural previously uncultivated land. This also includes a pipeline and pump station in order to obtain water from the Orange river for irrigation purposes.

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 applicants is the same person / company and therefore Procurements arrangements will not have to be made. The portions up for development is also situated on the most suitable area of the farms due to their favourable topography and location from the Orange River from where water will be obtained for irrigation. This will render the project viable from an economic and logistic perspective.

Layout Alternatives

The assessment area is approximately 535 ha in size and is in a natural pristine condition. Two layout alternatives are proposed which constitute ecologically and agriculturally suitable areas for the development and are summarised below:

Layout Alternative 1 (Preferred Layout Alternative)

The preferred layout alternative includes three separate areas. Areas 1, 2 and 3 are 11,2; 199 and 7,34 ha in size respectively. The total development area of this alternative equates to 217 ha. Smaller, temporary camps will then be laid out within the larger areas and grazed by means of a rotational system. These camps will then be irrigated by a pivot irrigation system.

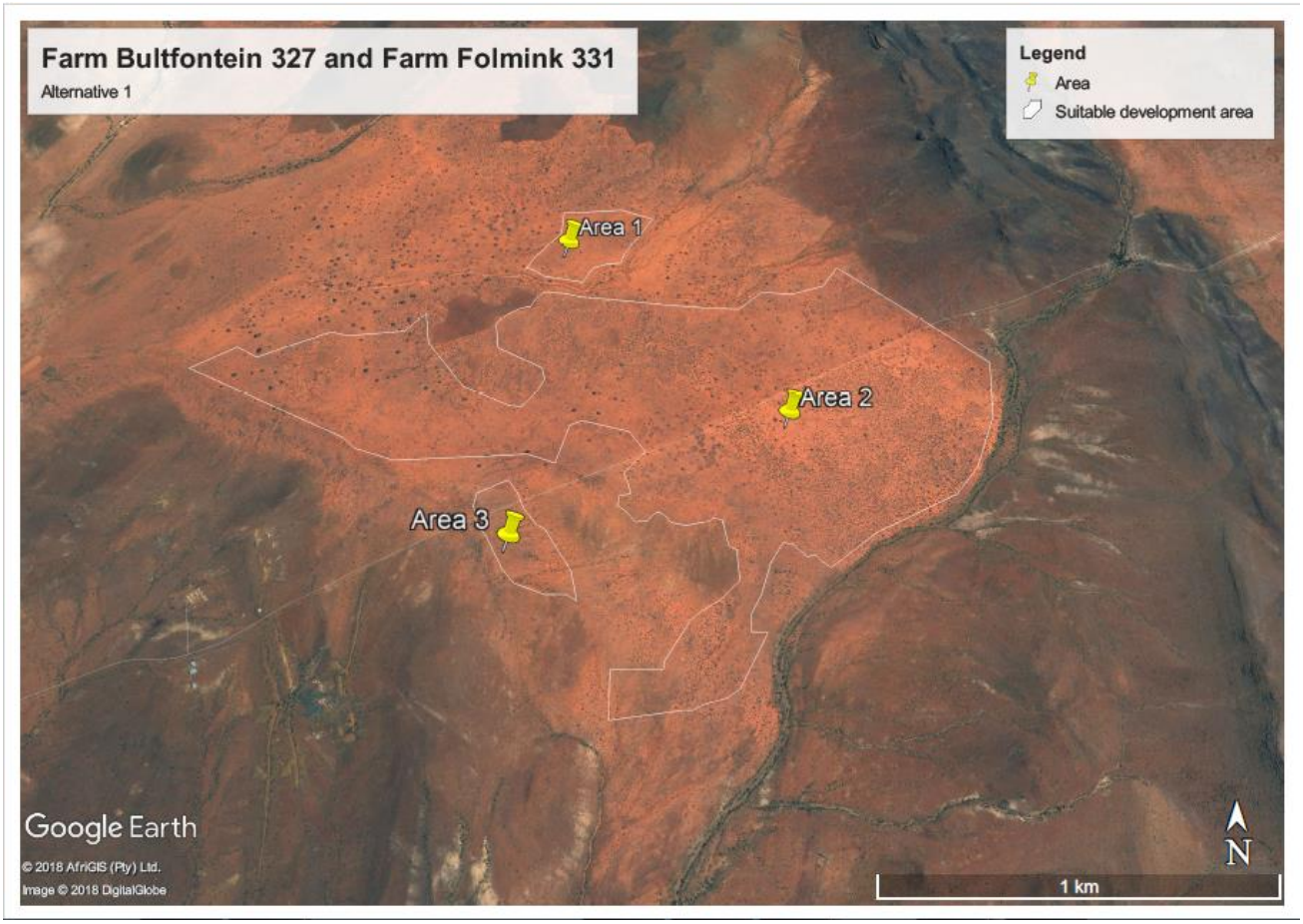


Figure 6: Farm Bultfontein 327 and Farm Folmink 331 Alternative 1 (Preferred Alternative)

Layout Alternative 2

This layout alternative includes two separate areas. Areas 2 and 3 are 199 and 7,34 ha in size respectively. The total development area of this alternative equates to 210 ha. Smaller, temporary camps will then be laid out within the larger areas and grazed by means of a rotational system. These camps will then be irrigated by using a pivot irrigation system.

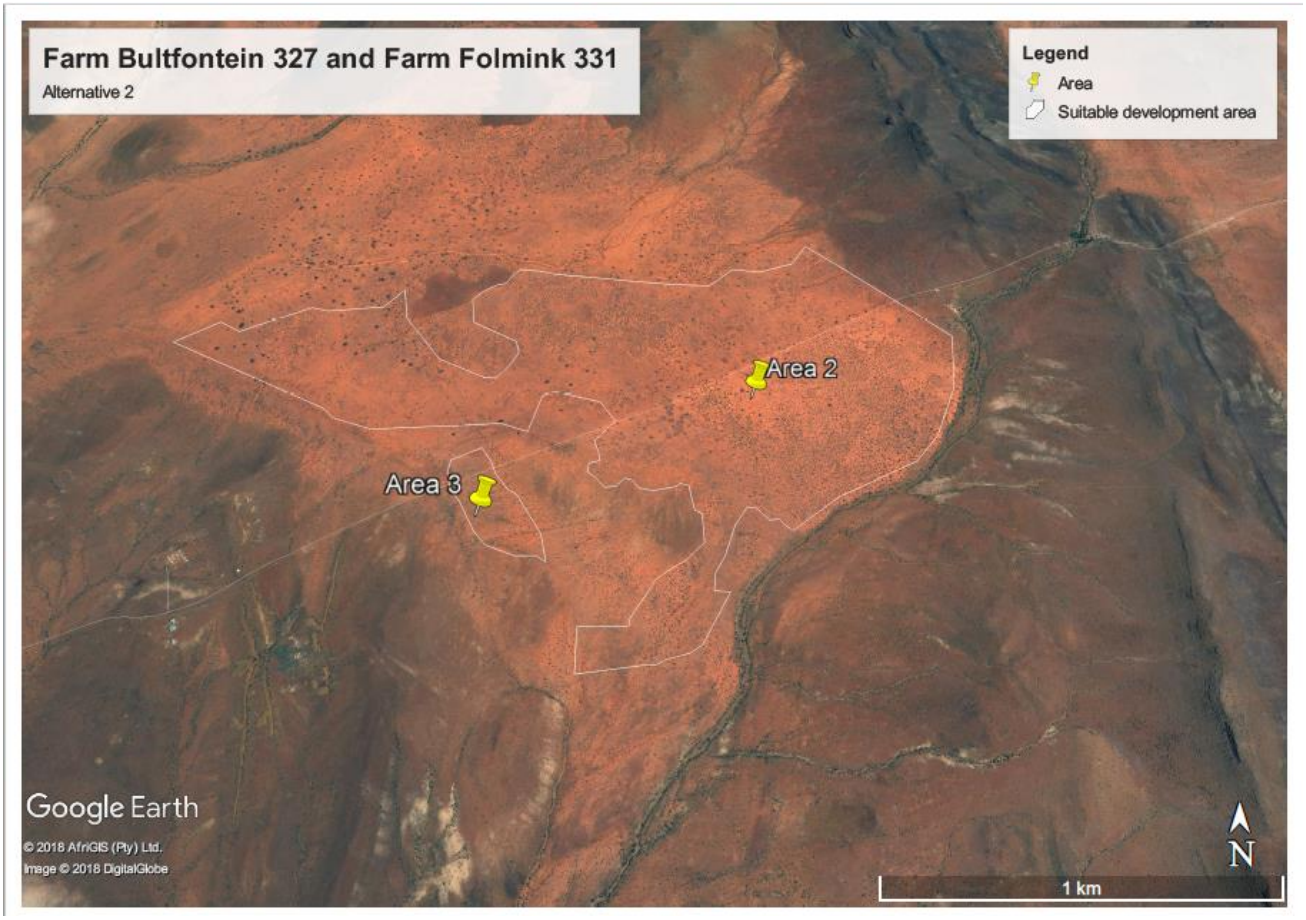


Figure 7: Farm Bultfontein 327 and Farm Folmink 331 Alternative 2

Some two track farm roads are already in place and will link up most of the camps.

A new water extraction point with pumping system and pipeline will be constructed and put in place to extract water from the Orange River on the Remainder of the Farm **Bultfontein No.** 327. This will be used for the irrigation of all pivots as described in this report.

The project will entail two major aspects namely:

- The construction of a pipeline and water extraction point in the Orange River.
- Cultivation of pivots and some two track access roads.

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

A new water extraction point with pumping system will be constructed and put in place to extract water from the Orange River on the Remainder of the Farm Bultfontein No. 327. This will be used for the irrigation of all pivots as described in this report.

Extraction Pump:

- The extraction pumps are 2x 110kW pumps and will be constructed outside the 1:100 meter flood line of the Orange River. The pumping station will cover an area of approximately 10m2. From here, the extraction pipe will be installed on a float (1x2m) which will be able to rise and descend with the water level. This will not significantly impact on any important riparian vegetation species as this area is mostly disturbed already
- The power for the extraction pump will be obtained from a new Eskom power point.
- The extraction pump will run for approximately 12 hours per day, pumping water to the amount of 300 m3 per hour (Monday to Friday).

Pipelines:

- A 500mm pipeline of approximately 5 km in length will be constructed to transport water from the extraction point in the Orange River to the booster pumps (110Kw) and from there with 250 mm and 315 mm pipelines directly into the pivots. A narrow section of approximately 900 mm will be cleared in order to accommodate the piping infrastructure. This will not significantly impact on any important riparian vegetation species as this area is mostly disturbed already. However, some tree species such as the *Acacia erioloba* (nationally protected) and *Acacia haematoxylon* (nationally protected) might also need to be removed in order to make way for the proposed pipeline. Once the exact location of the pipeline is available, an Ecological Walkthrough will be conducted to find the best possible route and to propose mitigations for the installation of the pipeline. This will be included in the ecological Impact Report which will be submitted as part of the Impact Assessment Phase of the Project. The pipeline will be constructed above ground.

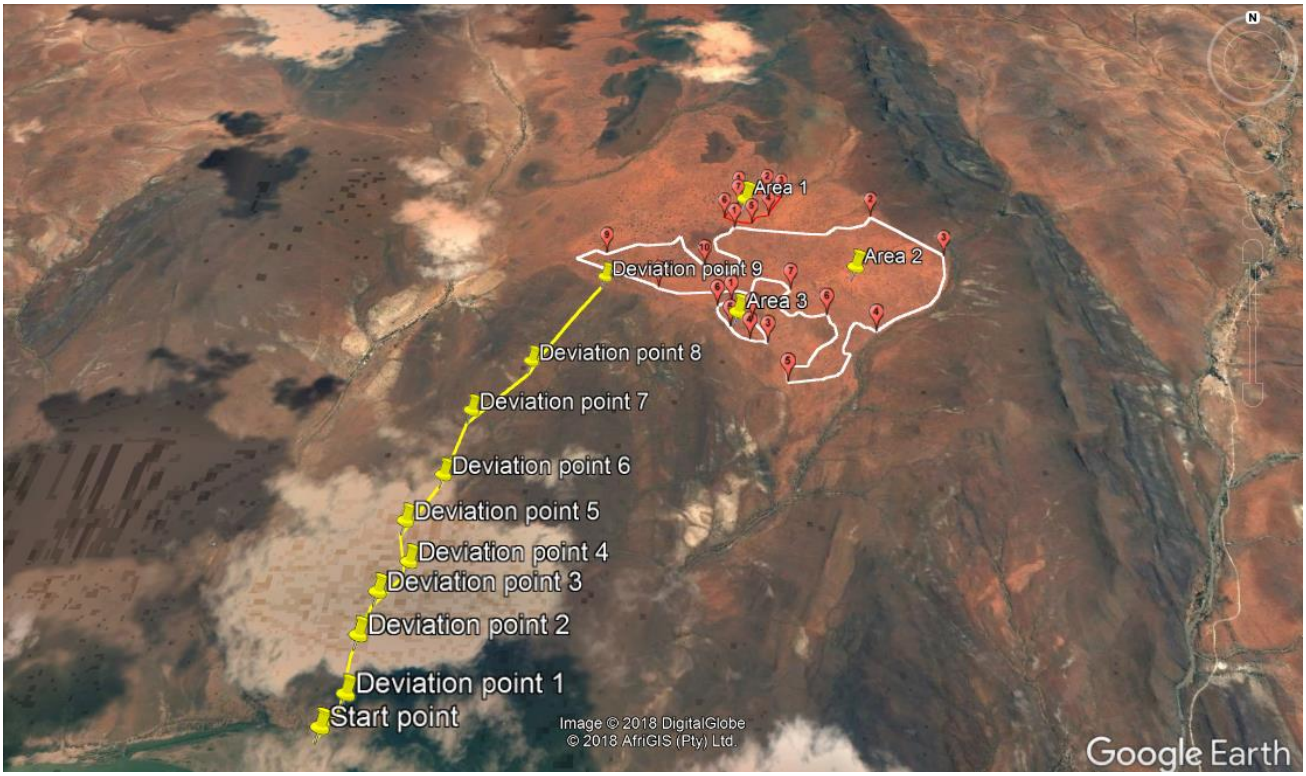


Figure 8: Pipeline route

4.2.2 Cultivation of 214 ha Grazing Pastures.

Three separate areas, in close vicinity to one another, respectively 199 ha, 11,2 ha and 7,34 in size will be developed on the Farm Bultfontein 327 as well as on Farm Folmink 331. These are the areas which have been deemed suitable by the various specialist studies.

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 forage crops, are incorporated into the growth medium (soil) prior to planting.
- Irrigation water will be abstracted from the Orange River as per the allotted water rights registration for the consolidated farm portions.

- See Appendix G for the water use rights documentation indicating the allowable water use which are still under consideration by the DWS, pending the outcome of the Environmental Impact Assessment and the Tillage certificate.
- 10 000 m³/ha/annum over a total 100 ha is allotted in terms of the water use rights documentation for irrigation specifically. As a result, additional Water use rights and authorisation will have to be obtained prior to the establishment of the irrigation system.

- Planting of grazing pastures will be conducted by means of a commercial planter.

4.2.3 Project Description Summary

The development will constitute a total footprint area of approximately 218 ha as indicated on the locality map. This will include the vegetation clearance for forage crop establishment as well as associated infrastructure such as the pipeline and extraction pump.

If the operational phase is ever concluded in the future, the area will be suitably 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 Orange River extraction point is the only aspect requiring electricity. The electricity will be obtained from an already established 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 above, water will be extracted from the Orange River for irrigation purposes. See Appendix G for the water use rights documentation indicating the allowable water use which are still under consideration by the DWS, pending the outcome of the Environmental Impact Assessment and the Tillage certificate. Additional Water use rights and authorisations will have to be obtained prior to the establishment of the irrigation system.

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:

With the exponential increase in human populations, the need for food is also increasing. It is thus of vital importance to increase the productivity of each hectare of land for meat production in order to meet this increasing demand. Natural veld on its own will not be able to fulfil this need, unless supplemented with irrigation.

The Northern Cape province of South Africa can be described as a large dry region with similar weather to desert and semi-desert areas. The average rainfall of Prieska is approximately 244 mm per year (www.climate-data.org). The maximum average monthly temperature is approximately 26.9°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 34.6°C in the summer months and dip to as low as 1°C during the winter.

The current irrigation guidelines of most temperate grasses, recommends 25 mm of irrigation water per week. This will however vary between different regions depending on the rate of evaporation.

When taking into account the climate of the Northern Cape province as well as the amount of water required by forage crops for successful establishment, it can be concluded that livestock farmers will be faced with various difficulties if they do not provide grazing pastures with additional irrigation.

The establishment of grazing pastures will thus enable the successful establishment and cultivation of grazing pastures which will subsequently lead to productive livestock farming which can aid in increasing food security of the country.

Since the applicant is specifically focusing on organic livestock farming, an additional motivation written by the applicant was provided to the EAP. This motivation is discussed under heading 5.2

5.1 Value of GRAZING PASTURES FOR LIVESTOCK PRODUCTION:

As mentioned above, South Africa as well as Prieska is a water stressed country and area, leading to various challenges for livestock farmers. The cultivation of forage crops will enable effective and productive livestock farming which will not only increase national food security but also the quality of meat produced.

According to an article published in the Journal of Animal Science, grass or pasture fed livestock provide many benefits to the consumer when compared to feedlot livestock:

- Lower in total fat
- Higher in beta-carotene

- Higher in vitamin E
- Higher in B-vitamins thiamine and riboflavin
- Higher calcium, magnesium and potassium content
- Higher in Omega 3
- A healthier Omega 6 to Omega 3 ratio
- Higher in CLA – a potential cancer fighter
- Higher in vaccenic acid which can be transformed into CLA
- Lower in saturated fats which have been linked to heart diseases

From these benefits it can be concluded that the production and subsequent consumption of pasture fed livestock will also increase the overall health of consumers.

Table 8: Comparison between nutritional value of grass fed and feedlot fed meat

	Omega 3 fatty acids (g/100g meat)	**Oleic acid (g/100g meat)**	**Total saturated and trans-fat (g/100g meat)**
Ground beef from grass (pasture fed)	0.055	6.3	9.8
Ground beef from grain fed feedlot	0.020	8.3	8.2

5.2 ADDITIONAL MOTIVATION WITH SPECIFIC REFERENCE TO FREE RANGE FARMING

"South African supply of free range animals for the local and international market has run into a shortage. Our national regular supply from various regions became under pressure due to the severe drought conditions in our supply regions including Namaqualand, Northern Cape, Central, Southern and Little Karoo as well as Eastern Cape Midlands. The availability of adequate water for irrigation from the Orange River Water Scheme is all-important for our financial survival and to produce sufficient numbers of animals for the market within the strict requirements of retail free range farming protocol. An intensive analysis of various production systems and consumer behaviour research has indicated that the best form of cattle and lamb operation should be intensive-extensive farming. This system suits with the dryer South African conditions with additional feed and pasture production as and when needed. The system further provide a higher profitability based on Free Range supply to a fast growing and environmental aware and concerned consumer market. This market is prepared to pay a premium for products originating from sustainable farming practices and environmentally friendly systems.

The feedlot industry is a highly competitive market which is dominated by approximately 5 major feedlots holding over 100 000 to 150 000 cattle, along with about 20 to 30 smaller feedlots which hold 5 000 to 50 000. In order to compete in this market, a feedlot must be able to provide a product that is different from the other role players. This can only be achieved on price. An A2 animal from one feedlot eats more or less the same quantity as an A2 animal from another feedlot. It also trades for the same price in the market. It would not be possible to compete on price with feedlots, which have efficient and mature systems designed to maximize the return per kg of beef or lamb produced per kg of feed intake. It is essentially an economies of scale based model where input/head and output/head determines yield and eventually profit.

There will always be a demand for feedlot beef, but any new feedlot operator would be trying to get their product into an already mature and stable market, with no or little ability of product differentiation. This is similar to launching a new fizzy drink to compete with Coca Cola and hoping to beat them at their own game that they have perfected with end-to-end efficiencies over the years! Your chances of becoming a dominant player against them in a free market are very limited.

Entering the industry can only be done by differentiating one from the feedlot industry. The feedlot industry's strength, which comes from size and economies of scale, is also its main weakness. Size makes them slow to change and to keep up with the end-consumers' ever changing requirements of how they want their meat. Customer preferences have been changing over the decades. Today's customer attitudes are very different from 10 years ago. The South African consumer has been spoilt by the cheap average price of beef which comes from the feedlot industry, however they have also become more aware of other aspects of food and farming. This is due to more information becoming available through the internet and many food television programmes which expose people to global practices, the impact of antibiotics on health e.g. allergies, nutritional effects of meat, and the impact that farming has on the environment, along with the welfare of farm animals.

Consumer research shows that most regular meat eaters are unaware what a feedlot looks like, or how the cattle are farmed. However, when they become aware of how animals are kept and treated and what they are fed prior to slaughtering they become exceptionally concerned. A major study carried out by a large South African retailer shows that what customers are becoming more concerned about when choosing their food are issues of animal welfare, routine antibiotic use in animals, growth promoters & hormones and the environment in general. All of these concerns are part and practices of the feedlot industry.

Because of this, there is an ever increasing demand for free range beef and lamb, but the farming industry is not set up to respond to this demand as yet. The feedlot industry cannot adjust to these market demands quickly enough, and therefore is leaving room for us to enter the market with limited competition. In addition to the above, several studies have shown that grass fed, free-range beef and lamb has a healthier nutritional profile than intensive grain-fed animals in the feedlot. The fatty acid profile of free range animals contains more of the desirable fatty acids and less of the undesirable ones, with the reverse being true of feedlot animals. We will finish our livestock in the field without any interference with the animal's normal feeding patterns in order to ensure that it supplies fully free range grown animals, as opposed to the feedlot system that uses grain for finishing.

The continued growth of the domestic red meat consumption is mainly fuelled by the rising income levels in South Africa. The growth is also supported by increased export demand. The signing of the meat export protocol between South Africa and China in February 2017 is one of the factors that will contribute to increased demand for red meat. The meat industry will benefit from the higher demand by being able to refine processes, find cost savings, and work toward providing more organic options. Animal production has contributed above 45% of the gross value of agricultural production over the past five years, while the share of red meat has increased from 30% of the value of livestock production to above a third over this same period. Furthermore, approximately 70 percent of South Africa's total area of 1.2 million km² is only suitable for livestock production. As per capita incomes increase in South Africa, the diets of the emerging middle-class changes to incorporate more animal proteins, including poultry meat, eggs, red meat and dairy products – and red meat is the only one of these product categories whose share of total livestock production has increased over the past five years.

South Africa's R37.6bn red meat industry has been constrained by challenges such as drought and has been unable to meet growing local demand. Consequently, South Africa currently finds itself as a net importer of mutton and pork and had only managed to become a net exporter of beef in 2014. In 2018, the local meat industry came under pressure following recent incidents of listeriosis which resulted in several neighbouring export destinations banning the import of some meat products from South Africa.

From 2013 to 2016, South Africa overtook the United States, India, China and New Zealand to become the third largest source markets for fresh beef to Kuwait and the UAE.

The Middle East shows itself to be a prominent market with very high growth rates. This market should be targeted for further growth potential together with specific Asian markets such as China and Vietnam.

According to MAFS (Modernising African Food Systems) consortium, the population in Africa will grow 15% to 1,2 bn which will represent 25% of the world population. Food consumption on Southern and Eastern Africa will more than triple by 2040. This augurs well for the red meat export industry

5.3 JOB CREATION $ SOCIO-ECONOMIC CONDITIONS

Anticipated CAPEX value of the project on completion	**R 80 000 000**
What is the expected annual income to be generated by or as a result of the project?	**R 120 000 000**
New skilled employment opportunities created in the construction phase of the project	**150**
New skilled employment opportunities created in the operational phase of the project	**100**
New un-skilled employment opportunities created in the construction phase of the project	**50**
New un-skilled employment opportunities created in the operational phase of the project	**50**
What is the expected value of the employment opportunities during the operational and construction phase?	**R 5 000 000**
What percentage of this value that will accrue to previously disadvantaged individuals?	**30%**
What percentage of this value that will accrue to previously disadvantaged individuals?	**30%**
The expected current value of the employment opportunities during the first 10 years	**R 50 000 000**
What percentage of this value that will accrue to previously disadvantaged individuals?	**75 – 80% with a total BBBEE of 60%**

Within the Siyathemba Local Municipality There are 7 099 (out of 21 591) people that are economically active (employed or unemployed but looking for work), and of these 24,3% are unemployed. 30,2% of the economically active youth (15-34 years), are unemployed. The fourth highest percentage of people within the municipality also have no source of income.

The applicant also esires to make a difference in this region, to address the imbalances of the past in the sector and, likewise, to attempt to tackle the prevailing white monopoly in the entire gamut of farming and, specifically, the meat production industry.

This project thus has the potential to positively influence the social and economic character of the surrounding areas.

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 l**ocation** 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 applicants is the same person / company and therefore Procurements arrangements will not have to be made. The portions up for development is also situated on the most suitable area of the farms due to their favourable topography and location from the Orange River from where water will be obtained for irrigation. This will render the project viable from an economic and logistic perspective.

6.2 LAYOUT ALTERNATIVES

The assessment area is approximately 535 ha in size and is in a natural pristine condition. Two layout alternatives are proposed which constitute ecologically and agriculturally suitable areas for the development and are summarised below:

Layout Alternative 1 (Preferred Layout Alternative)

The preferred layout alternative includes three separate areas. Areas 1, 2 and 3 are 11,2; 199 and 7,34 ha in size respectively. The total development area of this alternative equates to 217 ha. Smaller, temporary camps will then be laid out within the larger areas and grazed by means of a rotational system. These camps will then be irrigated by a pivot irrigation system.

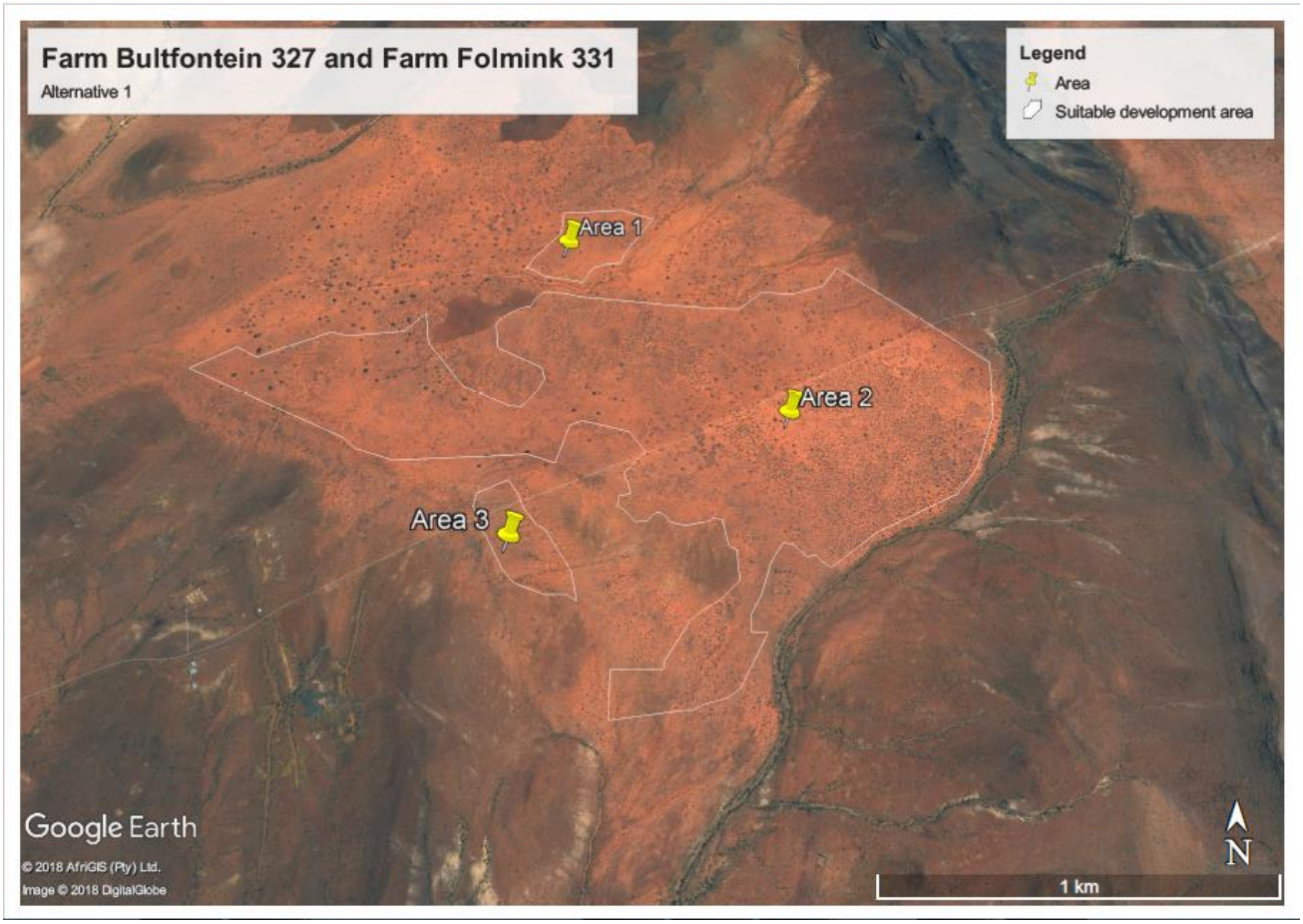


Figure 9: Bultfontein Preferred Alternative (Alternative 1)

Layout Alternative 2

This layout alternative includes two separate areas. Areas 2 and 3 are 199 and 7,34 ha in size respectively. The total development area of this alternative equates to 210 ha. Smaller, temporary camps will then be laid out within the larger areas and grazed by means of a rotational system. These camps will then be irrigated by using a pivot irrigation system.

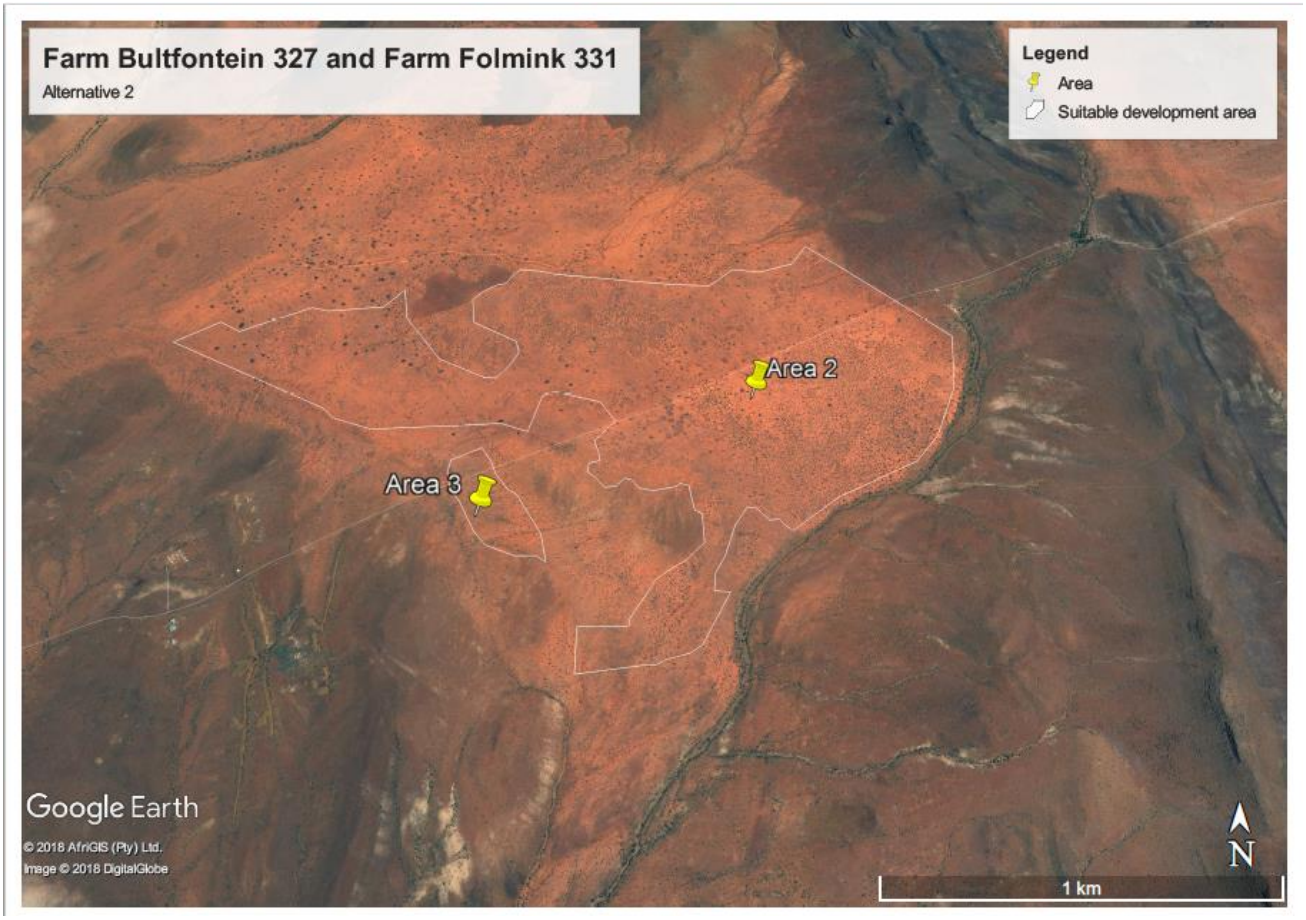


Figure 10: Bultfontein Alternative 2

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. The proposed project will contribute to local job creation by means of 150 new jobs. The low crazing capacity of the current land will be changed and developed which will have a positive influence on local economic growth.

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.

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 9) indicates the list of specialist studies that were conducted during the assessment process:

Table 9: List of Specialist Studies Conducted

Specialist Name	Organisation	Specialist Assessment Type
Mr. Rikus Lamprecht	EcoFokus	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 244 mm (www.climate-data.org). The maximum average monthly temperature is approximately 26.9°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 34.6°C in the summer months and dip to as low as 1°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 underlying geology is mainly formed by shales of the Volksrust Formation and to a lesser extent the Prince Albert Formation (both of the Ecca Group) as well as Dwyka Group diamictites. Broad areas are covered by superficial deposits including calcretes of the Kalahari Group. Soils are variable from shallow to deep, red-yellow apedal and freely draining with potential scattered rocky dolerite outcrops.

7.1.3 Topography

The assessment area constitutes a mosaic of flat to slightly sloping open and dense karroid shrubland mainly situated on deep red sandy Hutton soils. Due to the slightly sloping topography of the assessment area, the entire area forms part of the mid to upper region of a quaternary surface water catchment and drainage area which regionally drains towards the south and eventually discharges into the Orange River situated approximately 3.2 km south of the assessment area. A number of small but distinct slightly elevated ridge outcrops are scattered throughout the assessment area which house an increase in exposed soil surface rockiness.

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 E for the full Ecological Specialist Study. The section below describes the General Vegetation and Conservation status.

According to SANBI (2006-), the entire assessment area falls within the Northern Upper Karoo vegetation type (NKu 3) which mainly consists of flat to slightly sloping shrubland, dominated by dwarf karoo shrubs and sparse grasses. This vegetation type is classified as least threatened as very little has been transformed thus far (SANBI, 2006-).

The pipeline route traverses the Lower Gariep Broken Veld vegetation type (NKb 1) which constitutes hills and low mountains and slightly irregular plains dominated by sparse shrubs and dwarf shrubs (SANBI, 2006-). This vegetation type is also classified as least threatened (SANBI, 2006-).

The majority of the assessment area as well as the entire pipeline route is categorised as ‘Other Natural Area’ (ONA) while only a very small portion in the south-eastern corner of the assessment area falls within an Ecological Support Area (ESA) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province. The location of the pump station on the banks of the Orange River falls within a Critical Biodiversity Area one (CBA 1) in accordance with the NCPSBP.

CBA’s are areas that are irreplaceable or near-irreplaceable (CBA 1), or reflect an optimum configuration (CBA 2) for reaching provincial biodiversity targets for ecosystem types, species or ecological processes (Collins, 2017). Such an area must be maintained in a natural or near-natural state in order to meet biodiversity targets (Collins, 2017). ESA’s are areas that must be maintained in at least fair ecological condition (semi-

natural/moderately modified state) in order to support the ecological functioning of a CBA or protected area or that play an important role in delivering ecosystem services (Collins, 2017).

The mechanical clearance of vegetation and soil preparation associated with the proposed agricultural development will in all probability completely transform the majority of the existing natural surface vegetation on the assessment area.

See vegetation and sensitivity maps below.

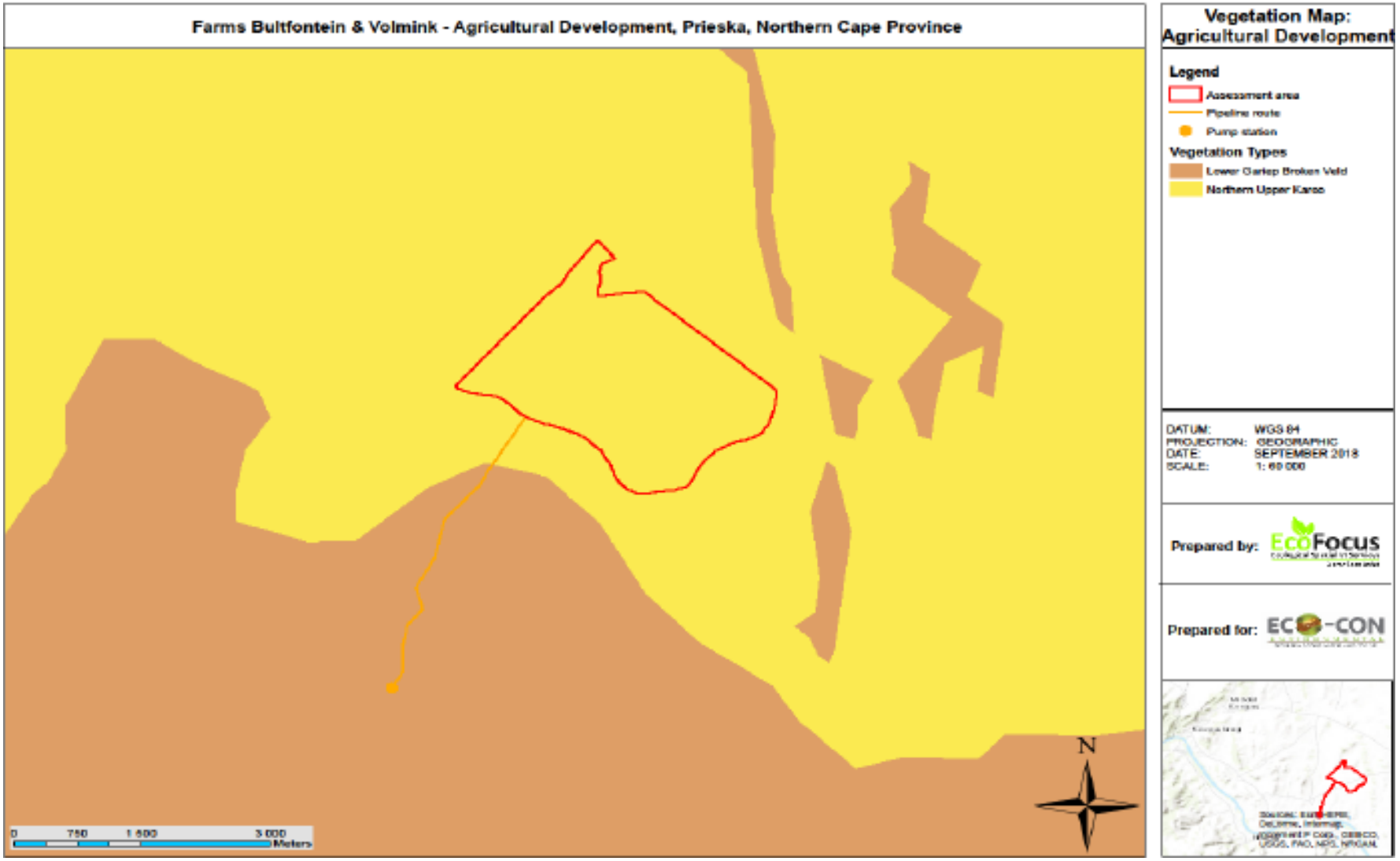


Figure 11: Vegetation map of the proposed project layout (see Appendix B for an A3 size version)

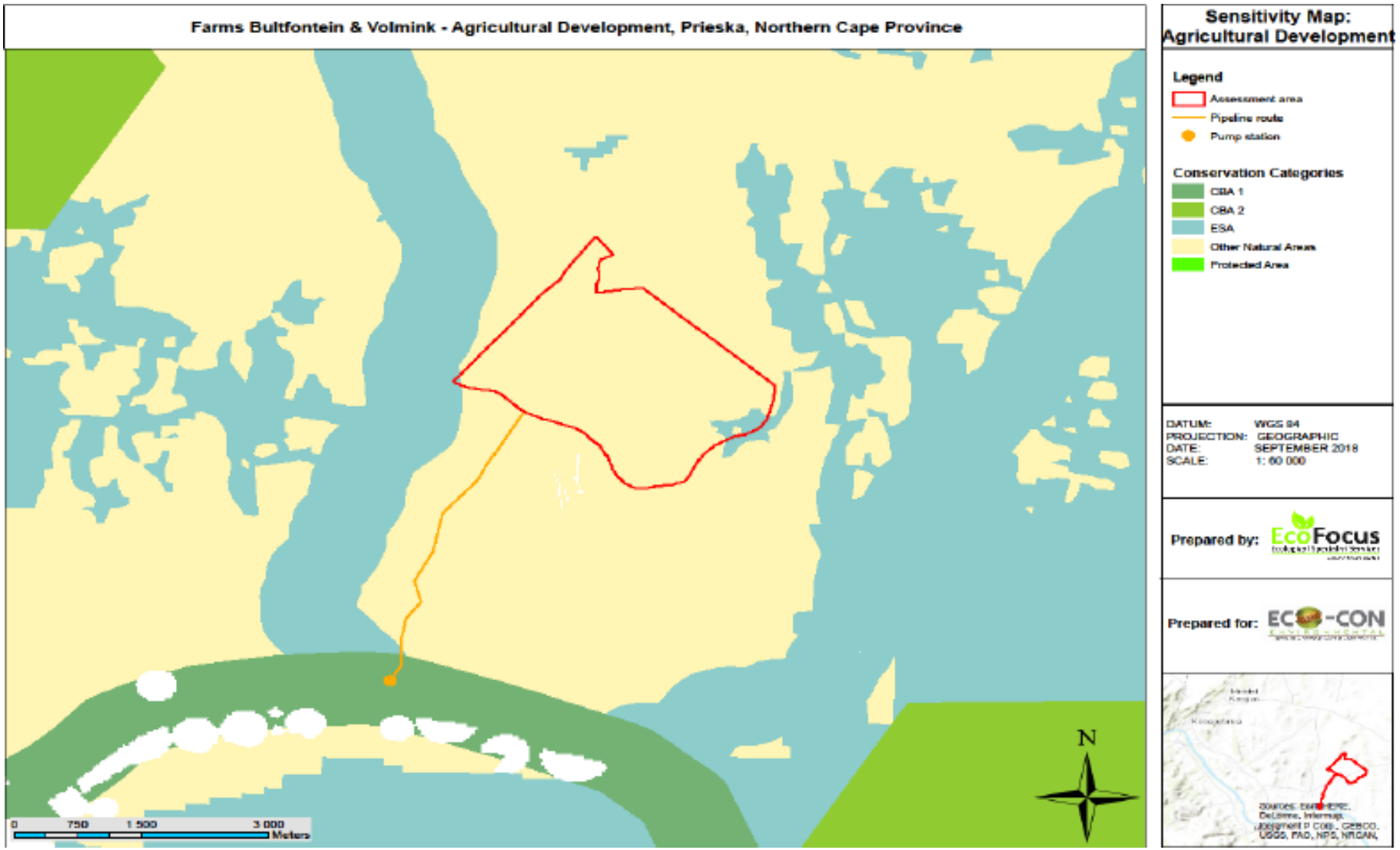


Figure 12: Ecological sensitivity map of the proposed project layout (see Appendix B for an A3 size version)

7.1.4.1 Terrestrial environment

Results and Discussion of the Specialist Report

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

- Open and dense sandy karroid shrubland
- Rocky ridge outcrops
- Ephemeral watercourses and water drainage lines

Each of the sections will now be discussed:

Open and dense sandy karroid shrubland

The assessment area mainly constitutes a mosaic of flat to slightly sloping open and dense sandy karroid shrubland. No distinct variation in vegetation species composition is evident between the open and denser areas. The open karroid shrubland areas are mainly dominated by a low growing shrub layer of the species *Pteroniaglauca, Rhigozumtrichotomum* & *Senegalia mellifera.* The density of the latter two species however increases significantly within the dense karroid shurbland areas while the density of *Pteroniaglauca*decreases. Other karroid shrub species also found to be present within the karroid shrubland include *Phaeoptilum spinosum, Eriocephalusericoides, Pteroniapallens, Pentziaspp, Eriocephalusaspalathoides, Asparagus spp., Chrysocomaobtusa* & *Crotolariaorientalis.* Woody shrub species which are sparsely scattered throughout the area include *Grewiaflava&Parkinsoniaafricana.*

The sparse grass layer is mainly dominated by the species *Centropodiaglauca, Stipagrostisobtusa* & *Enneapogondesvauxii.* Other grass species also found to be present but to a significantly lesser extent include *Arisitda spp., Schmidtiapappophoroides* & *Eragrostislehmanniana.*

Numerous bulb plant species individuals were found to be present within the assessment area but the timing of the site visit made successful species identification impossible. It is however expected that the assessment area will house a number of provincially protected bulb species and it is therefore recommended that an additional ecological walkthrough be conducted prior to the commencement of the project during the flowering period of underground bulb plant species. This will ensure that no provincially protected or significant species have potentially been omitted.

Figure 13: Two images illustrating the open and dense sandy karroid shrubland respectively

Tree and shrub individuals of the nationally protected species *Boscia albitrunca* & *Vachellia erioloba* are sparsely scattered throughout the southern and central portions of the assessment area. Approximately ≤ 85 *Boscia albitrunca* individuals and ≤ 180 *Vachellia erioloba* individuals are present within these southern and central portions. The majority of individuals of the latter species are however still relatively small (≤ 3.5 m in height) within the southern and central portions.

The density of these two nationally protected species however increases significantly within the northern portions of the assessment area and a high number of large mature individuals (≥ 7 m in height) of the species *Vachellia erioloba*are present there. Approximately ≤ 200 *Boscia albitrunca* individuals and ≤ 450 *Vachellia erioloba* individuals are present within these northern portions. Due to the presence of this well-established woody component within the northern portions, the areas subsequently also house numerous large congregated nests of sociable weavers (*Philetairussocius*) which is a provincially protected species. The areas are also utilised by various raptor and other predatory bird species for breeding, foraging and persistence purposes.

Due to the significant presence of these two nationally protected tree species within the northern portions of the assessment area, together with the area's distinctly associated ecology, it is recommended that a development line must be drawn through the assessment area and no development should be allowed to take place north of this line. If development north of the line is still considered by the applicant, it would highly likely require the implementation of a Biodiversity Offset as part of the NEMA mitigation hierarchy. A comprehensive Biodiversity Offset Feasibility Assessment and Report would therefore need to be conducted and compiled in order to identify and inform on areas of suitable size and similar ecological value which could meaningfully contribute to the provincial and national biodiversity targets and conservation strategies. The proposed Offset Feasibility Assessment and Report will have to be evaluated by the relevant departments in order to inform on their approval/rejection process.

The additional approximately 11 ha portion associated with Alternative 1 is situated north of the recommended development line. The location of this additional portion has however specifically been chosen in an area with few large mature individuals of the species *Vachellia erioloba*(≤ 15) relative to the rest of the area north of the development line. The development within this additional portion should therefore not result in any significant removal of nationally protected tree individuals and will not impact significantly on the continued ecological functionality and connectivity of the ecosystem north of the development line.

Due to the natural pristine state of the assessment area, the area is utilised by a wide variety of common and specialised small antelope as well as burrowing and predatory mammals for breeding, foraging and persistence purposes. The mobility of such faunal species along with the broad, continuous surrounding natural landscape allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas.

Figure 14: Two images illustrating the significantly higher density of large mature individuals of the nationally protected species Vachellia erioloba within the northern portions of the assessment area.

Figure 15: Two images illustrating the presence of numerous large congregated nests of provincially protected sociable weavers (Philetairussocius) within the northern portions of the assessment area

Rocky ridge outcrops

The small but distinct slightly elevated rocky ridge outcrops which are scattered throughout the assessment area, constitute a slight variation in vegetation species composition relative to the surrounding sandy karroidshrubland. Similar to the surrounding open karroidshrubland, the rocky ridge outcrops are mainly dominated by a low growing shrub layer of the species *Rhigozumtrichotomum* & *Senegaliamellifera.* The shrub layer of the rocky ridge outcrops is however even sparser than that of the surrounding open karroidshrubland.

The species *Pteroniaglauca*which is dominant within the surrounding open karroidshrubland, as well as the woody shrub species *Grewiaflava&Parkinsoniaafricana*, are further absent from the rocky ridge outcrops.

The grass layer is similar to that of the surrounding sandy karroidshrubland but is even sparser. Diagnostic forb species associated with the rocky ridge outcrops and which are mainly absent from the surrounding sandy karroidshrubland include *Barleriamacrostegia, Euphorbia burmannii*(provincially protected)*, Blepharismitrada, Aptosimumspinescens* & *Thesiumhystrix.* Only two individuals of the provincially protected species *Aloe claviflora*were also found to be present within the rocky ridge outcrops.

Although the nationally protected tree species Bosciaalbitruncais prominent within the rocky ridge outcrops, the other nationally protected tree species found within the assessment area, Vachellia erioloba, is completely absent as it is mainly confined to the deep sandy soils of the surrounding karroidshrubland.

Although not necessarily being conservational significant, these rocky ridge outcrops possess locally distinct faunal habitat attributes due their increased soil surface rockiness and it is reasonably expected that these areas are utilised by various specialised reptilian species as refuge and for breeding, foraging and persistence purposes. It is therefore recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible.

Figure 16: Two images illustrating the increase in exposed soil surface rockiness within the rocky ridge outcrops.

Ephemeral watercourses and water drainage lines

Due to the slightly sloping topography of the assessment area, the entire area forms part of the mid to upper region of a quaternary surface water catchment and drainage area which regionally drains towards the south and eventually discharges into the Orange River situated approximately 3.2 km south of the assessment area. The ephemeral watercourses which traverse the assessment area therefore form an important part of the quaternary surface water catchment and drainage. The majority of the small water drainage lines traversing the assessment area, eventually dissipate into the surrounding sandy karroidshrubland but also form part (although less significant) of the water catchment and drainage area.

The lack of continuous water flow through the assessment area, has resulted in the watercourses not possessing any distinct riparian zones or variation in vegetation species composition relative to the surrounding sandy karroidshrubland. However, due to the significance of the quaternary surface water catchment and drainage area, it is recommended that the ephemeral watercourses be adequately buffered out of the proposed development footprint and that no significant development is allowed to take place within the buffer zone.

Figure 17: Two images illustrating the significant ephemeral watercourses which traverse the assessment area.

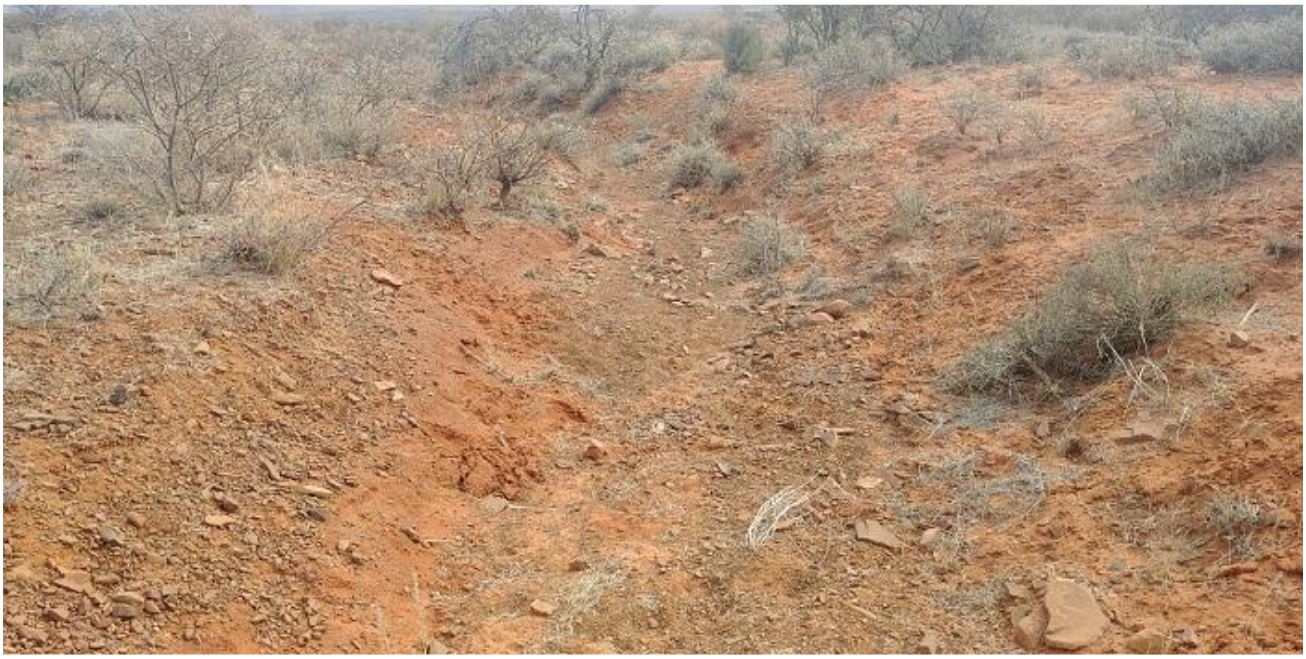


Figure 18: Two images illustrating the small water drainage lines which traverse the assessment area and eventually dissipate into the surrounding sandy karroid shrubland.

7.1.4.2 Conclusions and Recommendations

The mechanical clearance and soil preparation associated with the proposed agricultural development will in all probability completely transform the majority of the existing surface vegetation on the assessment area.

Both the Northern Upper Karoo (NKu 3) and Lower Gariep Broken Veld (NKb 1) vegetation types associated with the assessment area, are classified as least threatened as very little has been transformed thus far (SANBI,

2006-). The majority of the assessment area as well as the entire pipeline route is further categorised as 'Other Natural Area' (ONA) while only a very small portion in the south-eastern corner of the assessment area falls within an Ecological Support Area (ESA) in accordance with the NCPSBP, which sets out biodiversity priority areas in the province. The location of the pump station on the banks of the Orange River falls within a Critical Biodiversity Area one (CBA 1) in accordance with the NCPSBP.

The assessment area is in a natural pristine condition and scored a very high PES value. The broader areas surrounding the assessment area, which are associated with the relevant vegetation types, are extremely vast and also largely natural and undeveloped. The size of the proposed development is therefore small relative to the surrounding natural region.

Although no Red Data Listed species of conservational significance were found to be present within the assessment area, the provincially protected species *Euphorbia burmannii* &*Aloe claviflora*were encountered within the rocky ridge outcrops. It is therefore recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible. It is also expected that the assessment area will house a number of provincially protected bulb species. It is therefore further recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulb plant species. This will ensure that no provincially protected or significant species have potentially been omitted.

Furthermore, tree and shrub individuals of the nationally protected species *Boscia albitrunca* & *Vachellia erioloba* are sparsely scattered throughout the southern and central portions of the assessment area. Approximately ≤ 85 *Boscia albitrunca* individuals and ≤ 180 *Vachellia erioloba* individuals are present within these southern and central portions. The majority of individuals of the latter species are however still relatively small (≤ 3.5 m in height) within the southern and central portions.

The densities of these two nationally protected species however increase significantly within the northern portion of the assessment area and a high number of large mature individuals (≥ 7 m in height) of the species *Vachellia erioloba* are present there. Approximately ≤ 200 *Boscia albitrunca* individuals and ≤ 450 *Vachellia erioloba* individuals are present within the northern portion. Due to the presence of this well-established woody component within the northern portion, the area subsequently also houses numerous large congregated nests of sociable weavers (*Philetairussocius*) which is a provincially protected species. The area is also utilised by various raptor- and other predatory bird species for breeding, foraging and persistence purposes. The northern portion of the assessment area is therefore viewed as being of relatively high conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and nationally protected tree species.

Due to the significant presence of the two nationally protected tree species within the northern portion of the assessment area, together with the area's distinctly associated avifaunal ecology, it is recommended that a theoretical development line must be drawn through the assessment area and no development should be allowed to take place north of this line. If development north of the line is still considered by the applicant, it would highly likely require the investigation and implementation of a suitable Biodiversity Offset as part of the NEMA mitigation hierarchy. A comprehensive Biodiversity Offset Feasibility Assessment and Report would therefore need to be conducted and compiled in order to identify and inform on potential areas of suitable size and similar ecological value which could meaningfully contribute to the provincial and national biodiversity targets and conservation strategies. The proposed Biodiversity Offset Feasibility Assessment and Report will have to be evaluated by the relevant competent authorities in order to inform on their approval/rejection process. It is recommended that the Department of Agriculture, Forestry and Fisheries be informed of the application as an Interested & Affected Party during the Public Participation Process in order for them to provide comment and recommendations in this regard.

Although the additional approximately 11.2 ha portion associated with Alternative 1 is situated north of the recommended development line, the location of this additional portion has specifically been chosen in an area with a lower tree density and few large mature individuals of the species *Vachellia erioloba* (≤ 15) relative to the rest of the area north of the development line. The development within this additional portion will therefore not result in the removal of a significant number of nationally protected tree individuals and should not necessarily impact significantly on the continued ecological functionality and connectivity of the broader ecosystem north of the development line.

Individuals of the two nationally protected tree species are also sparsely scattered along the pipeline route. No individuals of the two nationally protected tree species are to be removed during the pipeline construction phase and the pipeline route is to be diverted around any individuals of these two species if encountered.

The ephemeral watercourses which traverse the assessment area, form an important part of the mid to upper region of a quaternary surface water catchment and drainage area which regionally drains towards the south and eventually discharges into the Orange River situated approximately 3.2 km south of the assessment area. The ephemeral watercourses are therefore viewed as being of relatively high conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and the surface water catchment and drainage area. It is therefore recommended that the ephemeral watercourses be adequately buffered out of the proposed development footprint and that no significant development is allowed to take place within the buffer zone.

A significant number of small drainage lines feed into the directly adjacent ephemeral watercourse all along the length of the proposed pipeline route. The local catchment and drainage all along the length of the pipeline route towards the ephemeral watercourse, could therefore be significantly impeded by the construction of the aboveground pipeline. Construction and design of the proposed pipeline should take into account the significant number of small drainage lines and the pipeline must be installed in a manner so as not to permanently impact or impede on the local surface water drainage towards the ephemeral watercourse.

It is the opinion of the specialist that the potentially significant ecological impacts associated with the contamination and impeding of the flow regimes of the significant ephemeral watercourses as well as destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area, can be suitably reduced and mitigated to within acceptable residual levels. The project should therefore be considered by the competent authority for environmental authorisation and approval.

Although Alternative 2 will result in the transformation of an approximately 11.2 ha smaller footprint area (total of 206.34 ha) relative to Alternative 1 (total of 217.54 ha), there is no significant difference in ecological impact ratings between the two alternatives. It is recommended that Alternative 2 rather be considered due to its slightly smaller impact footprint but either alternatives should prove to be acceptable for development.

See specialist report in Appendix E.

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 400 ha field on the Remainder of the Farm Bultfontein No. 327 in order to assess the suitability of the area for irrigation for forage crops.

7.1.5.1 Soils forms

The soils encountered during the survey are shown in the table below (table 10).

Table 10: soils encountered during the survey

Soil Form	A Horizon	B Horizon	B2/C Horizon	Nr of Profiles
Hutton	Orthic A	Red Apedal B	Unspecified	60
Plooysburg	Orthic A	Red Apedal B	Hardpan Carbonate	8
Glenrosa	Orthic A	Lithocutanic B	Rock	11
Mispah	Orthic A	Rock		3

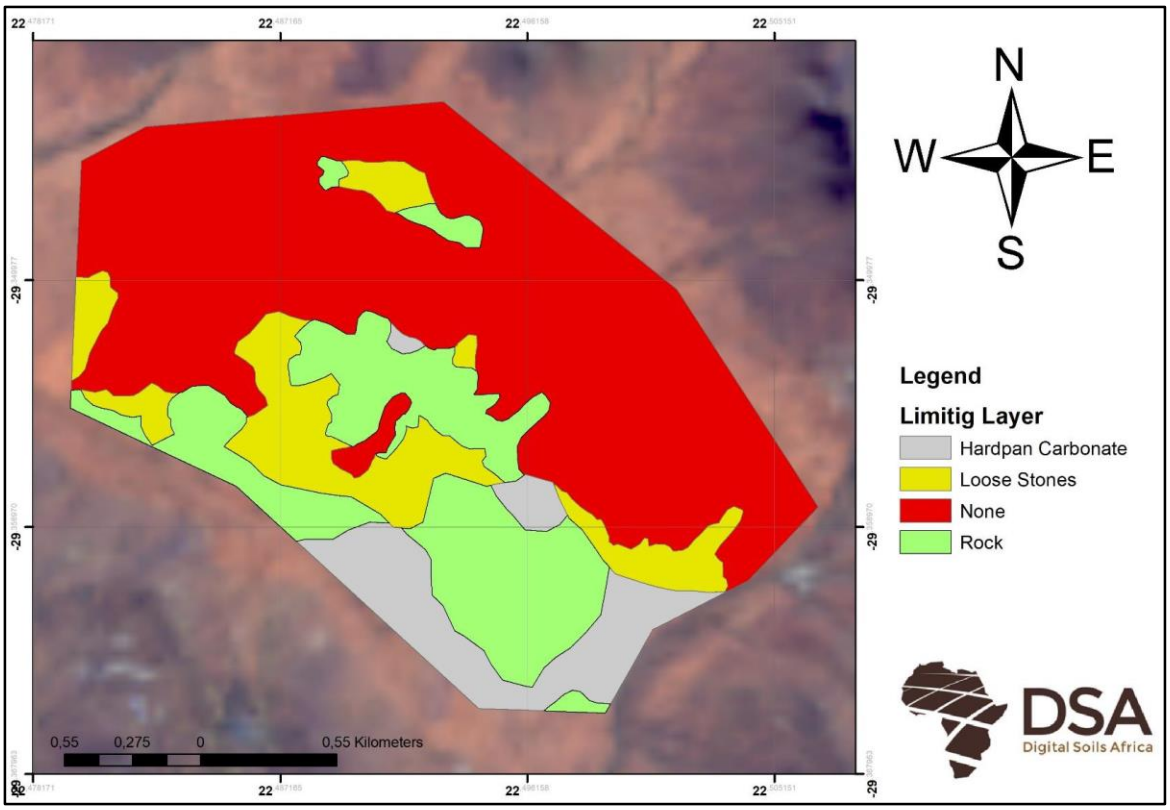


Figure 19: Illustration of soil forms encountered

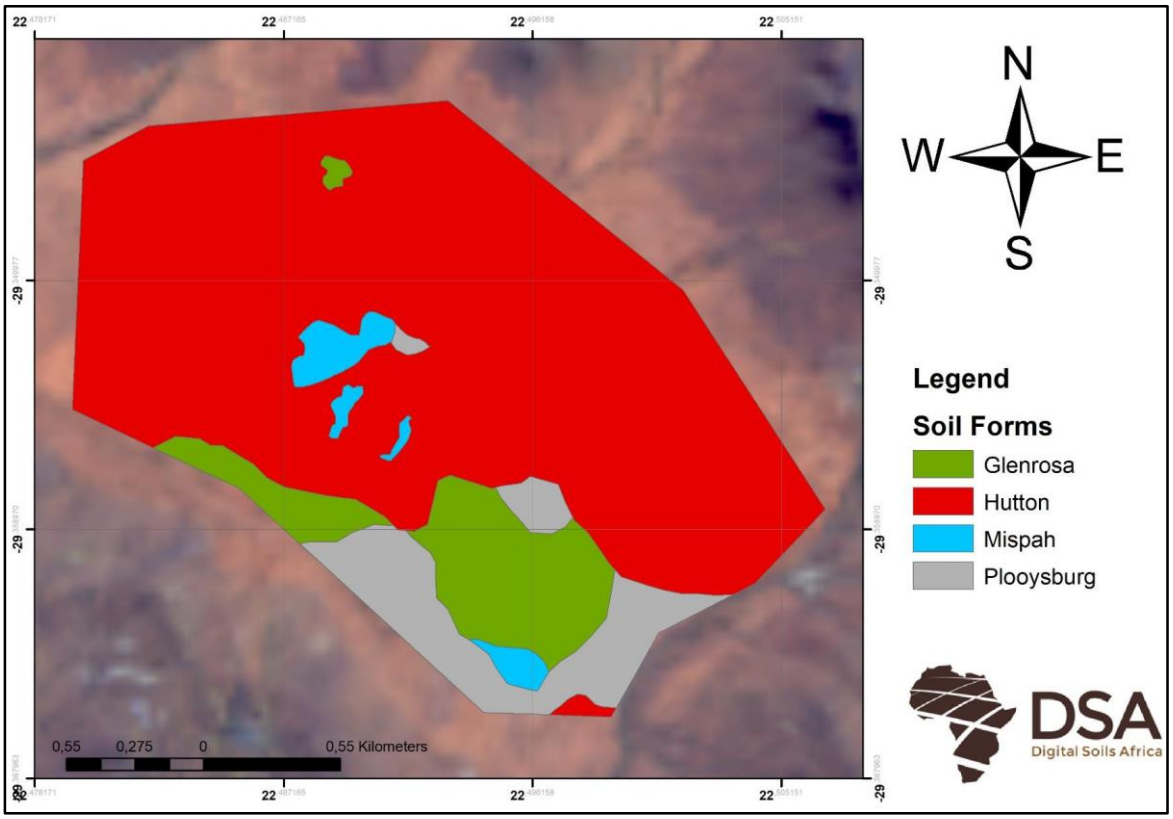


Figure 20: Illustration of infiltration limiting material

7.1.5.2 Soil Depth

The freely drainable depth (Figure 21 below) is the depth up to where the water can freely drain. It includes the depth of the lithocutanic B. The drainable depth is the same as the freely drained depth, with the exception of 200 mm added when a soft carbonate is the limiting layer, to accommodate potential infiltration into the soft carbonate horizon and.shows the depth at which artificial drainage can be installed. For this, 300 mm below the depth of the lithocutanic B was added, if hard rock was not yet encountered.

The soils of the site are generally deep, often no limiting layer was reached. Towards the south the soils are shallower, with hardpan carbonate accumulation. There are small areas, easily distinguishable in the field, where shallow soils occur, which must be omitted from irrigation.

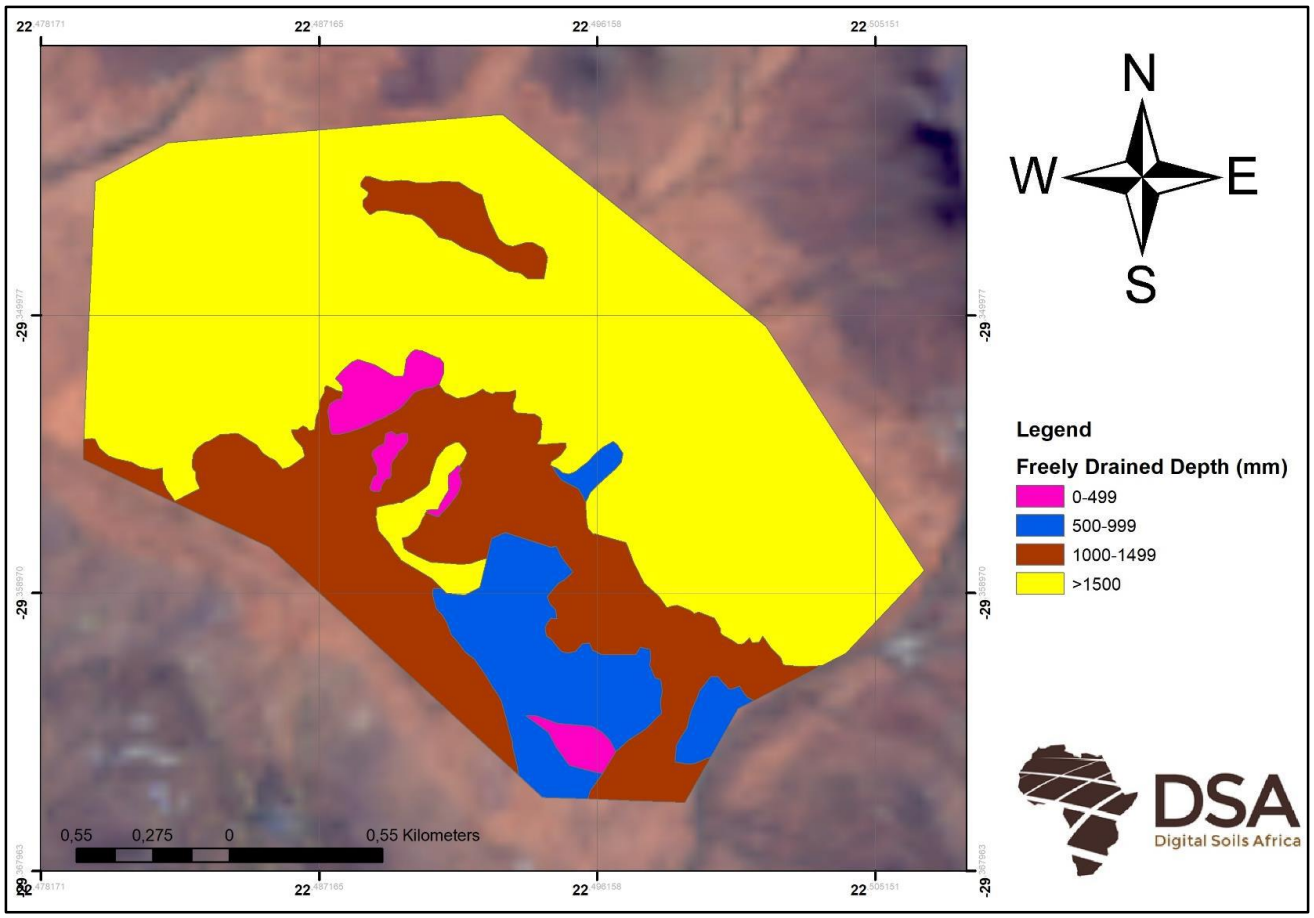


Figure 21: Illustration of drainable depths

7.1.5.3 Suitability

Most the observations indicate that the soil is suitable for irrigation, as the profiles are deep with indications of good internal drainage. There are however some rock outcrops with shallow soils which should not be used, as well as an area in the south of the site where the soils are shallow, with either rock or hardpan carbonates prohibiting drainage. The area shown as suitable for irrigation is the area where the drainable depth is deeper than 1000 mm. This is shallower than normally considered suitable and was done to enable centre pivot layout,

as the shallower soil area occurs on the fringes of the deeper soils. Excluding them, could cause entire centre pivots to not be used. The farmer will be well advised to use the areas shallower than 1500 mm the inclusion of centre pivots largely on the areas shown to be deeper than 1500 mm.

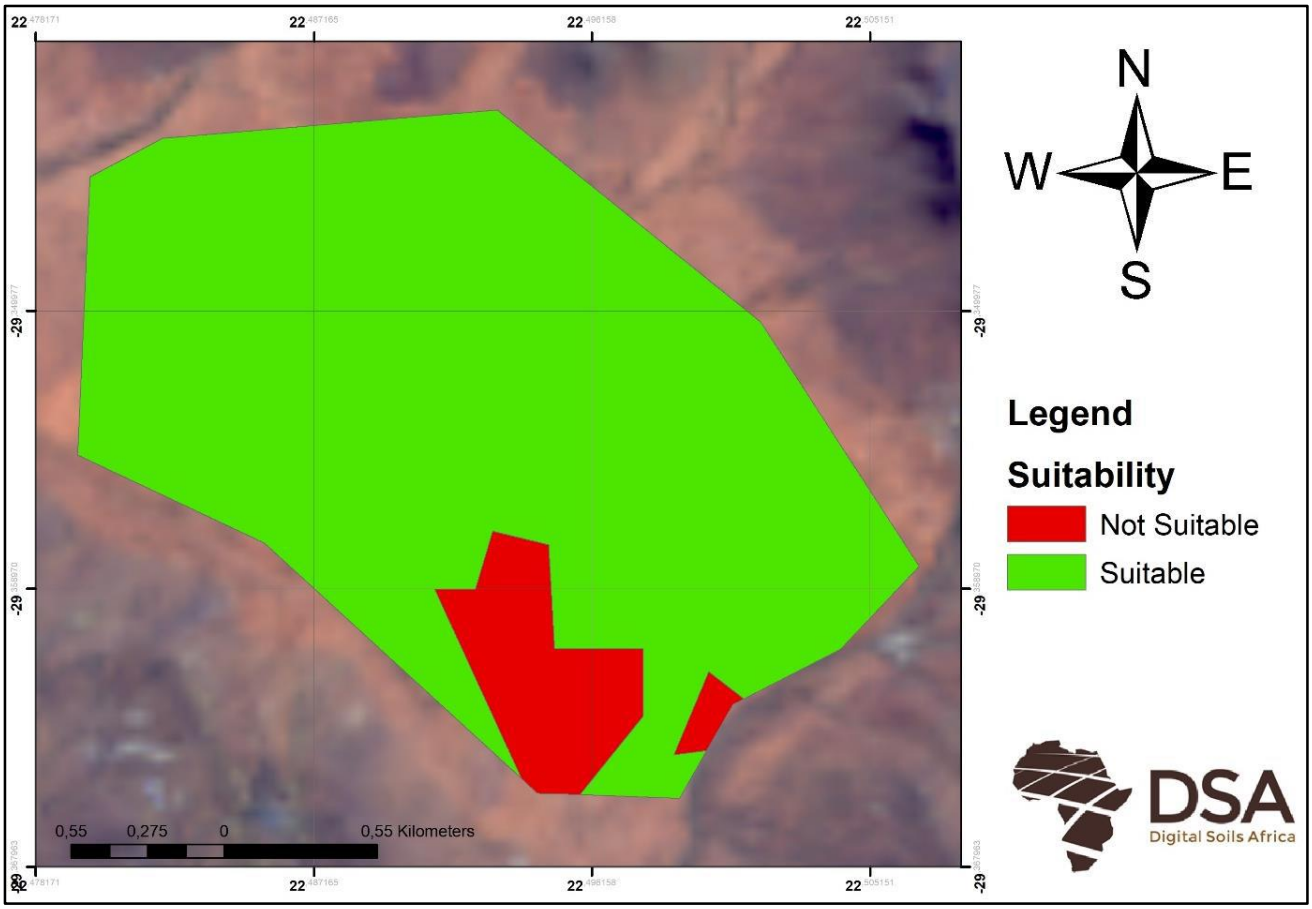


Figure 22: Illustration of suitability of the proposed project area

7.1.5.4 Conclusion

Pedological results indicate that 376 ha of the 530 ha is suitable for grazing pasture irrigation. This includes an area of 106 ha which is slightly shallower and should only be used to fit centre pivots.

See specialist report in Appendix E4.

7.1.6 Heritage

A Phase 1 Heritage Impact Assessment was carried out on the farm Bultfontein 327 situated near Prieska in the Northern Cape Province, as part of an application for agricultural development. Vaalian aged basement rocks within the affected area (Ghaap Group, Transvaal Supergroup) are covered in places by well-developed superficial sediments made up of basin -accumulated Quaternary wind-blown sand deposits, variable clasts of surface gravels, and reworked calcretes. Results from a foot survey of the lower valley fills near the Orange

River (pipeline and pump station) as well as upland areas (pipeline and agricultural area) show no evidence of above-ground, in situ Stone Age archaeological sites. There are also no indications of rock art, prehistoric structures, graves or historically significant structures older than 60 years within the areas that were surveyed. Given the nature and scale of the proposed development the development footprint is not considered to be palaeontologically or archaeologically vulnerable. The survey area is assigned a rating of Generally Protected C (GP.C). The development can proceed provided that activities are confined to the proposed footprint.

See specialist report in Appendix E.

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:

Siyathemba Local Municipality:

There are 7 099 (out of 21 591) people that are economically active (employed or unemployed but looking for work), and of these 24,3% are unemployed.

30,2% of the economically active youth (15-34 years), are unemployed.

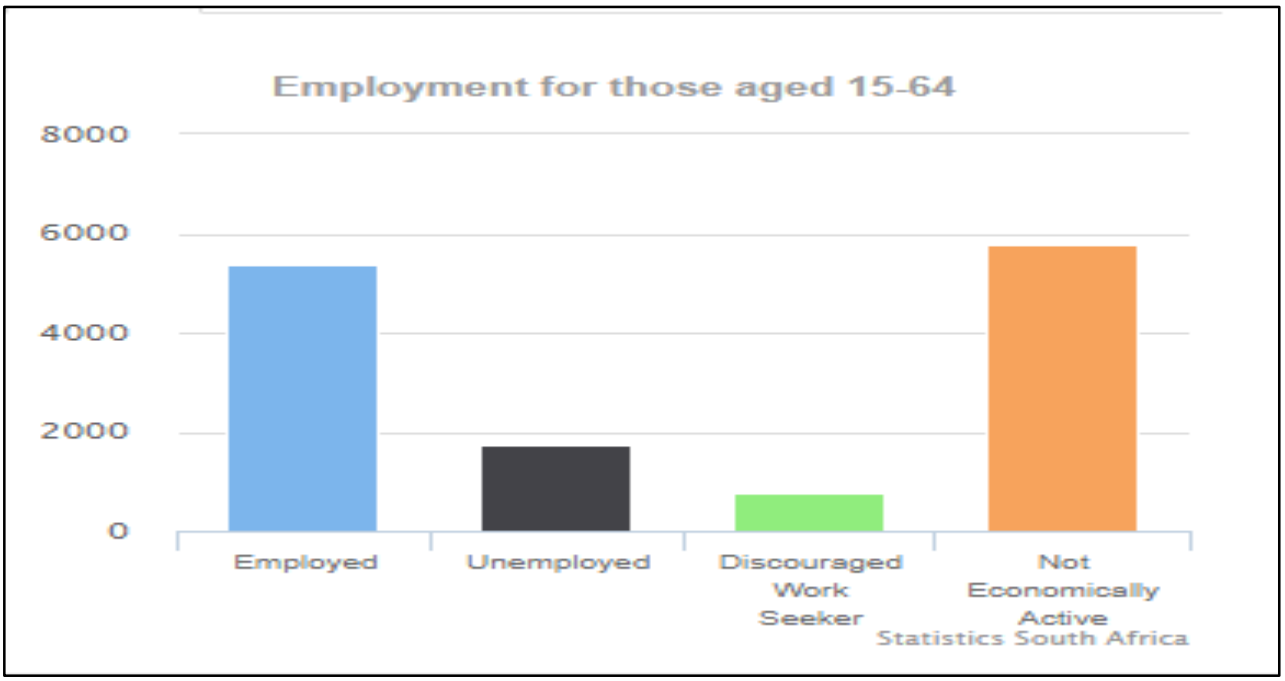


Figure 23: Employment Graph for those aged 15-64

Economic profile:

The Economic Profile of the Siyathemba 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.

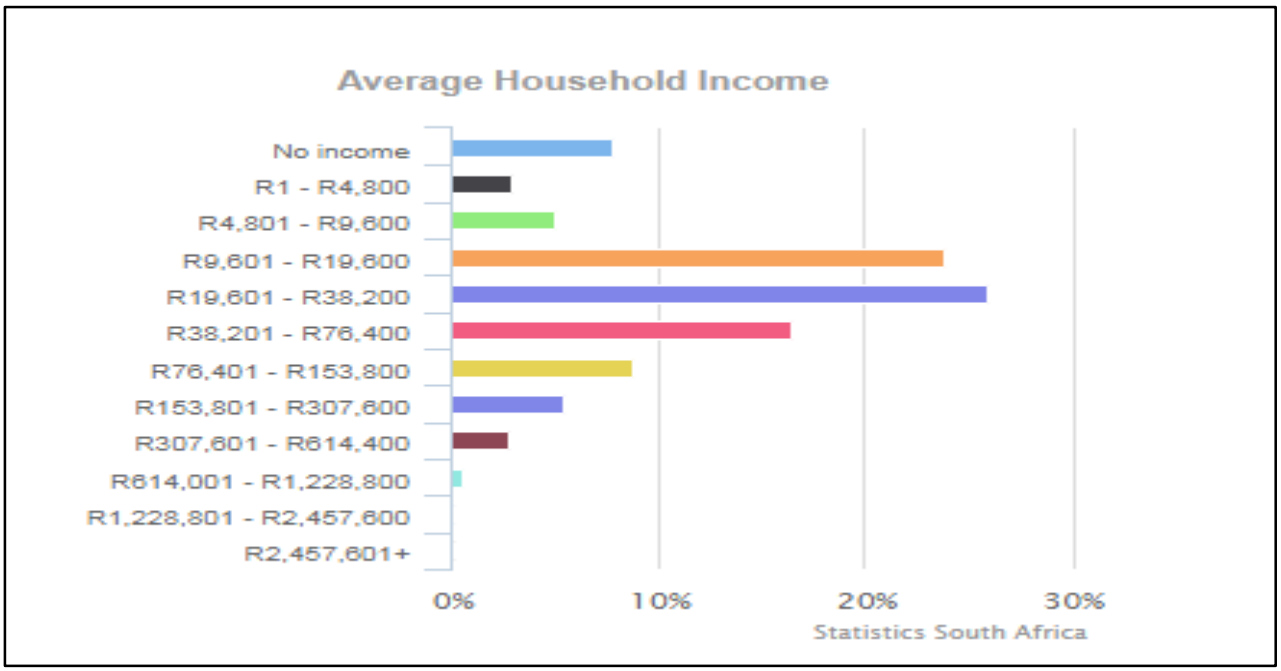


Figure 24: Economic profile graph indicating household income

Level of Education:

According to the Census, Siyathemba Local Municipality has a total population of 21 591 people. The majority of the population in the municipality are coloured at 71,9% ; 18,8% are Black African ; 8,5% are White, 0,5% are Indian/Asian, with the other population groups making up the remaining 0,4%.

Of those aged 20 years and older, 7,4% have completed primary school, 29,8% have some secondary education, 7,4% have completed matric and 0,5%have some form of higher education. Of the mentioned age group, 11,5% have no form of schooling.

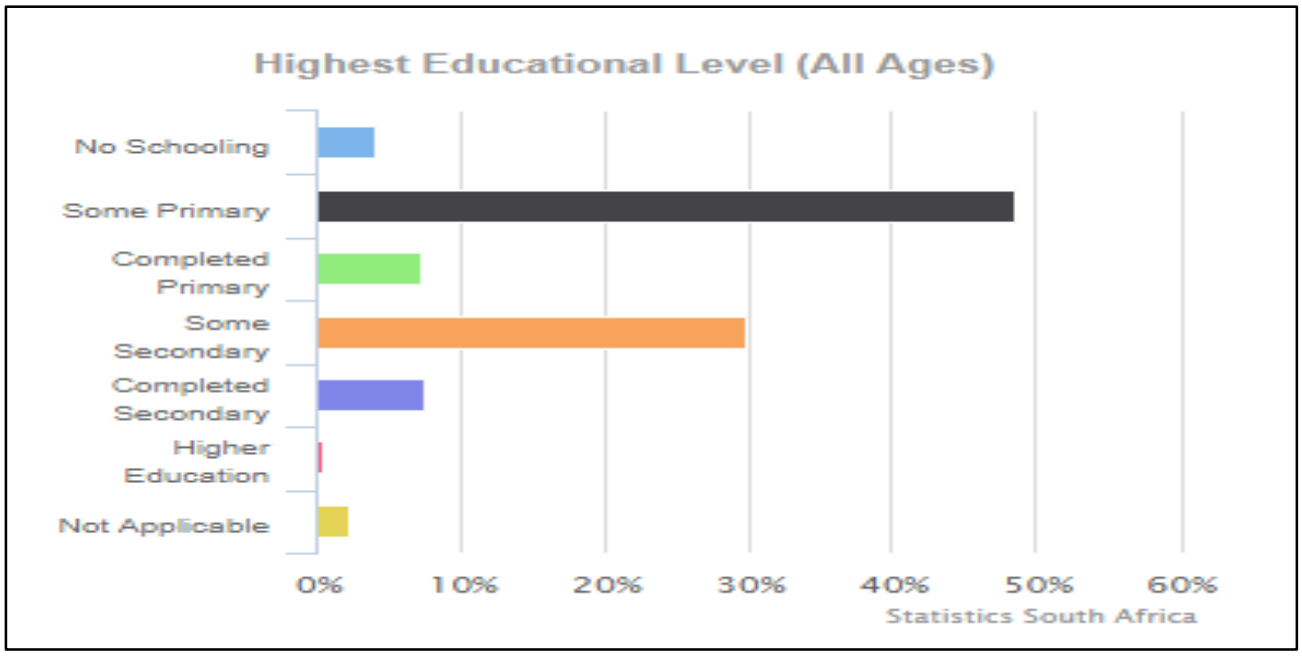


Figure 25: Education graph indicating education levels

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 Final Scoping Report commenced on 22 May 2019 and concluded on 21 June 2019. 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 22 May 2019.
- An advertisement was placed in the local newspaper (Northern Cape Express) on 22 May 2019to inform potential I & AP's and invite them to register for the proposed project.
- Written notices were placed at the Siyathemba local Municipality in Prieska on 22 May 2019.
- Site notices were placed at the main entrance of the Remainder of the farm Bultfontein & Folminkas well as at certain portion along the R 383on 22 May 2019.
- Hardcopies of the draft Scoping Report were made available at the Prieska public library for public viewing on 22 May 2019.
- A hardcopy was hand delivered at the offices of the competent authority on 22 May 2019.

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, 2014 (As amended in April 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 the Final Scoping Report as per Regulation 42 of the EIA Regulations, 2014(as emended in April 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 5 September 2019.

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

<table>
<tr><th colspan="5">Comments Received during the Scoping 30 Day PPP</th></tr>
<tr><th>Number</th><th>Organisation</th><th>Name</th><th>Tel/Cell</th><th>Email</th></tr>
<tr><td>1.</td><td>Northern Cape Department Water and Sanitation (DWS)</td><td>Me. Vhonani Ramugondo</td><td>053 830 8825</td><td>ramugondov@dws.gov.za</td></tr>
<tr><td>Comments Received:</td><td colspan="4">
water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Northern Cape Provincial Operations, Private Bag X 6101, Kimberley, 8301, 28 Central Road Beaconsfield
Kimberley, Tel: 053 836 7600, Fax: 053 842 3258

053 830 8825 | Vhonani Ramugondo
ramugondov@dws.gov.za | 053 836 7648

Great Force Investments (Pty) Ltd
P.O. Box 29262
Dan Hof
Bloemfontein
9310

By Email/Registered Mail

Attention: Johan Botes
E-mail: johan@eco-con.co.za

RE: COMMENTS ON THE DRAFT SCOPING REPORT FOR PROPOSED CULTIVATION OF 217 HA VIRGIN SOIL FOR THE ESTABLISHMENT OF GRAZING PASTURES AND ASSOCIATED WATER PIPELINE ON THE FARMS BULFONTEIN NO.327 AND FOLMINK NO.331 NEAR PRIESKA, NORTHERN CAPE PROVINCE.

Reference is hereby made to Draft Scoping Report for the proposed development of agriculture on The Farms Bulfontein No.327 and Folmink No.331 by Great Force Investments (Pty) Ltd as submitted to the Department of Water and Sanitation, received on 21 May 2019.

1. RECOMMENDATIONS AND DECISION

As mentioned in the report, the Department takes note that the proposed activity at the above mentioned location will include cultivation of 217 ha virgin soil for the establishment of grazing pastures and associated water pipeline located 40 km north-west of the town of Prieska in Siyathemba Local Municipality. The Department has evaluated the said Draft Scoping Report and has no objection to the approval of the Scoping Report. However, the following should be addressed and presented to Department by the applicant before approval of the Final Scoping Report:

a) Please note that the Department rates all perennial and non-perennial rivers together with all dry river beds and natural drainage and associated riparian areas extremely sensitive to development. An option of developing/ constructions furthest away from the all water course would be the preferred option;

NDP 2030 NATIONAL DEVELOPMENT PLAN Our Future - make it work
Page 1 of 3
</td></tr>
</table>

RE: COMMENTS ON THE DRAFT SCOPING REPORT FOR PROPOSED CULTIVATION OF 217 HA VIRGIN SOIL FOR THE ESTABLISHMENT OF GRAZING PASTURES AND ASSOCIATED WATER PIPELINE ON THE FARMS BULFONTEIN NO.327 AND FOLMINK NO.331 NEAR PRIESKA, NORTHERN CAPE PROVINCE.

b) No development or construction should be done or may occur within 100 metres; 1:100 year flood line of a river/drainage lines (whichever is furthest) and 500 m of a pan/wetland without authorisation from this Department. The water courses should be delineated in order to provide an appropriate buffer to maintain such water courses;

c) All the relevant water uses must be clearly identified and elaborated according to the National Water Act (Act 36 of 1998);

d) Vehicles and other machinery must be serviced well above the 1:100 year flood line or within a horizontal distance of 100 meters from any watercourse or 500 m of a wetland/pan. Oils and other potential pollutants must be disposed at an appropriate licensed site, with the necessary agreement from the owner of such a site;

e) Storm water must be diverted from the construction works and roads must be managed in such a manner as to disperse runoff and to prevent the concentration of storm water. Storm water control works must be constructed, operated and maintained in a sustainable manner throughout the project;

f) Increased runoff due to vegetation clearance and/or soil compaction must be managed, and storm water leaving the construction site must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises;

g) A detailed layout plan needs to be submitted to the Department showing all the facilities in the proposed development including distance from the any watercourses. Details of the final design must also be included as soon as a decision has been made, as the details of this factor may influence the environmental impact both during the construction and operational phases of the project;

h) Material with pollution generating potential must be limited in construction activities and. Any hazardous substances must be handled according to the relevant legislation relating to transport, storage and use of the substance.

i) Any spillage of any hazardous materials including diesel that may occur during construction and operation must be reported immediately to our Department;

j) The final Scoping Report must clearly show all water courses as defined in the National Water Act, 1998 (Act 36 of 1998) as well as the delineated 1:100 year flood lines or 100 meters of a river/drainage line (whichever is furthest) and 500 metres.

k) Clear color topographical map showing the property, facilities in the property, land use, water courses and location of water abstraction point.

l) The disposal of general waste and that of hazardous waste must be carried out in an environmentally safe way as to prevent and/or minimise the potential for pollution of water resources and collection of which should be done by an accredited waste collector. All

Page 2 of 3

RE: COMMENTS ON THE DRAFT SCOPING REPORT FOR PROPOSED CULTIVATION OF 217 HA VIRGIN SOIL FOR THE ESTABLISHMENT OF GRAZING PASTURES AND ASSOCIATED WATER PIPELINE ON THE FARMS BULFONTEIN NO.327 AND FOLMINK NO.331 NEAR PRIESKA, NORTHERN CAPE PROVINCE.

applicable Sections of the National Environmental Management: Waste Act 59 of 2008 should be strictly adhered to;

m) A rehabilitation and monitoring plan must be included in the report;

n) Your client is therefore advised to apply and obtain the water use authorisation prior to commencement of the proposed activities. The applicant should send the intent to apply for a water use authorisation to the Department;

o) Should the project continue; pre-consultation meeting must be arranged and a site visit and must be conducted by DWS officials with the applicant, and then followed by a Water Use Licence Application (proof of consultation and submission of an application). This must be submitted to DWS in terms of the National Water Act, 1998 (Act 36 of 1998) before any activities take place;

p) All applicable Sections of the National Environmental Management: Waste Act 59 of 2008 should be strictly adhered to;

q) Section 19 & 20 of the National Water Act, 1998 (Act No.36 of 1998) should be adhered to;

This reply does not grant any exemption from the requirements of any applicable Act, Ordinance, Regulation or By-law.

This office reserves the right to revise initial comments and request additional information that may arise from correspondence and/or upon inspection.

You may contact the Department should you have any enquiries.

Yours sincerely

pp

DIRECTOR: INSTITUTIONAL ESTABLISHMENT
DATE: 31/05/19

Page 3 of 3

Response from EAP	**Johan** **From:** Johan <johan@eco-con.co.za> **Sent:** Monday, 12 August 2019 11:22 AM **To:** 'Ramugondo Vhonani' **Subject:** RE: comments for Draft Scoping Report Good day Vhonani Hope all is well? Eco-Con Environmental hereby confirm receipt of your comments related to the mentioned project. We als that all comments have been taken into account and has been incorporates in our reporting. All condition will form part of the EMP to be submitted with the Impact Assessment report. We also inform that a Water Use License Application will be submitted and be applied for once all documen ready for submission. Have a great day. Kind regards Johan Botes 082 459 8206 / johan@eco-con.co.za ECO-CON ENVIRONMENTAL BECAUSE A GOOD PLANET IS HARD TO FIND Reg no.: 2017/232414/07 VAT no.: 4760279309 JOHAN BOTES MANAGING DIRECTOR (MD) B.A. Honours In Geography (UFS) B.A. Geography and Environmental Management (UFS) IAIA*saReg.: 4043 / AIS Reg.: 1032 +27 (0)82 459 8206 +27 (0)51 436 1251 +27 (0)86 592 2282 www.eco-con.co.za

8.2 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The PPP for the Impact Assessment Report commenced on 18 September 2019 and will conclude on 18 October 2019. The following means will be 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 18 September 2019.
- Hardcopies of the Impact Assessment Report were made available at the Siyathemba local Municipality in Prieska and the public library for public viewing on 18 September 2019.
- A hardcopy was hand delivered at the offices of the competent authority on 18 September 2019.

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

The following table (table 12) list all identified Stakeholders / Organs of State / Organisations / Interested and Affected Parties which were notified of the proposed project.

Table 12: Stakeholders / Organs of State / Organisations / Interested and Affected Parties notified

Name and Surname	Organisation	Department	Email / Postal:	Tel:
Mr. IW Stadhouer	SiyathembaLocal Municipality	Municipal Manager	mm@siyathemba.gov.za	053 353 5317
Mr. JakobBasson	Siyathemba Local Municipality	Infrastructure Department (Environmental Representative)	jakobbasson@siyathemba.gov.za	053 353 5306
Ms. Gloria Speelman	Siyathemba Local Municipality	Ward 4 (four) Ward Councillor	gloriaspeelman.gs@gmail.com	082 693 5024
Mr. Rodney Pieterse	PixleyKaSeme District Municipality	Municipal Manager	mm@pksdm.gov.za	0536310891
Mr. S. Nkondeshe	PixleyKaSeme District Municipality	Environmental Department	pixley@telkomsa.net	0536310891
Ms. Natalie Uys	Department of Environment and Nature Conservation	Ecological and Botanical Department	nuys.denc@gmail.com	053 807 7300/7472
Mr. ThulaniMthombeni	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	AgriNoordkaap	Commenting Authority	hrouxx@gmail.com	0718607550
Mr.VhonaniRamugando	Northern Cape Department of Water and Sanitation	Commenting Authority for the region	ramugondov@dws.gov.za	053 836 7609
Ms. 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

Mrs. Jacolene Mans	Department of Agriculture, Forestry and Fisheries	Commenting Authority	JacolineMa@daff.gov.za	(054) 338 5909
Mr. Hennie de Bod	Landowner	Landowner	hennie@safam.co.za	0828813191
Dr. KiewietVlok	Neighbouring / Surrounding Landowners / Occupiers	Neighbour	vlok.jhk@gmail.com	0836261826
Mr. Hannes Vlok	Neighbouring / Surrounding Landowners / Occupiers	Neighbour	vlok.jhk@gmail.com	0722178505
Mr. DB Lubbe	Neighbouring / Surrounding Landowners / Occupiers	Neighbour	db.prieska@gmail.com	0828014846

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 13: 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)	**10 - Very high**: Bio-physical and/or social functions and/or processes might be *severely* altered. **8 - High**: Bio-physical and/or social functions and/or processes might be *considerably* altered. **6 - Medium**: Bio-physical and/or social functions and/or processes might be *notably* altered. **4 - Low** : Bio-physical and/or social functions and/or processes might be *slightly* altered. **2 - Very Low**: Bio-physical and/or social functions and/or processes might be *negligibly* altered. **0 - Zero**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
	10 - Very high (positive): Bio-physical and/or social functions and/or processes might be *substantially* enhanced. **8 - High (positive)**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced.

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

	1 - Improbable: <5% chance of the potential impact occurring.
Evaluation Component	**Rating Scale and Description/criteria**
CUMULATIVE impacts	**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. **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. **Low**: The activity is localised and might have a negligible cumulative impact. **None**: No cumulative impact on the environment.

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 14 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 14: 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.

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:

- 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.
- Adequately cordon off the construction area and ensure that no construction activities, machinery or equipment operate or impact within the natural surrounding areas outside the cordoned off area.
- 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.
- No site construction camps to be established within the surrounding natural areas outside the project footprint areas.
- Natural veld situated in-between the proposed forage crop 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.
- It is recommended that a development line must be drawn through the assessment area and no development should be allowed to take place north of this line.
- It is recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible.

- An additional ecological walkthrough is to be conducted prior to the commencement of the project during the flowering period of underground bulbous plant species.
- The pump station, pipeline route and surrounding areas must be adequately rehabilitated as soon as practically possible after construction.
- A rehabilitation management plan must be developed for this by a suitably qualified and experienced ecologist.
- It is recommended that no large mature tree individuals be removed during construction of the pump station and associated pipeline up the river banks but that pipeline infrastructure be constructed underneath the dense tree canopy.
- No individuals of the two nationally protected tree species are to be removed during the pipeline construction phase and the pipeline route is to be diverted around any individuals of these two species if encountered.
- A Provincial Flora Permit has to be obtained for all provincially protected species prior to the commencement of any construction activities.
- A National Protected Tree Permit has to be obtained for all nationally protected tree species prior to the commencement of any construction activities.
- Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan during the construction and operational phases. Such a management plan must be compiled by a suitably qualified and experienced ecologist.
- 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 cultivated 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.

- 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.
- 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.
- Adequately cordon off the construction area and ensure that no construction activities, machinery or equipment operate or impact within the natural surrounding areas outside the cordoned off area.
- No site construction camps to be established within the surrounding natural areas outside the project footprint areas.
- It is recommended that a development line must be drawn through the assessment area and no development should be allowed to take place north of this line.
- The pump station, pipeline route and surrounding areas must be adequately rehabilitated as soon as practically possible after construction.
- A rehabilitation management plan must be developed for this by a suitably qualified and experienced ecologist.
- Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan during the construction and operational phases. Such a management plan must be compiled by a suitably qualified and experienced ecologist.
- It is recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible.

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.
- Were 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.
- Specials care are to be taken not to work near or disturb any vulture nests, especially during breading 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: Transformation of terrestrial vegetation on the assessment area associated with the Northern Upper Karoo (NKu 3) and Lower Gariep Broken Veld (NKb 1) vegetation types			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	4	6	4	2	2	2
Duration:	4	3	4	3	4	4	1
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	3	2	3	2	2	1
Reversibility:	4	3	4	3	3	2	2
Probability:	4	4	4	4	3	2	2
Total SP:	72	60	72	60	39	24	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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. • Adequately cordon off the construction area and ensure that no construction activities, machinery or equipment operate or impact within the natural surrounding areas outside the cordoned off area. • No site construction camps to be established within the surrounding natural areas outside the project footprint areas. • Natural veld situated in-between the proposed cultivated lands must not be impacted upon and must be left in situ. • It is recommended that a development line must be drawn through the assessment area and no development should be allowed to take place north of this line. • If development north of the line is still considered by the applicant, it would highly likely require the investigation and implementation of a suitable Biodiversity Offset as part of the NEMA mitigation hierarchy. A comprehensive Biodiversity Offset Feasibility Assessment and Report would therefore need						

	to be conducted and compiled in order to identify and inform on potential areas of suitable size and similar ecological value which could meaningfully contribute to the provincial and national biodiversity targets and conservation strategies. The proposed Biodiversity Offset Feasibility Assessment and Report will have to be evaluated by the relevant competent authorities in order to inform on their approval/rejection process. It is recommended that the Department of Agriculture, Forestry and Fisheries be informed of the application as an Interested & Affected Party during the Public Participation Process in order for them to provide comment and recommendations in this regard. • Although the additional approximately 11.2 ha portion associated with Alternative 1 is situated north of the recommended development line, the location of this additional portion has specifically been chosen in an area with a lower tree density and few large mature individuals of the species *Vachelliaerioloba* (≤ 15) relative to the rest of the area north of the development line. The development within this additional portion will therefore not result in the removal of a significant number of nationally protected tree individuals and should not necessarily impact significantly on the continued ecological functionality and connectivity of the broader ecosystem north of the development line. • Existing roads and farm tracks in close proximity to the proposed project area must be used during construction. • It is recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible. • The pump station, pipeline route and surrounding areas must be adequately rehabilitated as soon as practically possible after construction. • It is recommended that no large mature tree individuals be removed during construction of the pump station and associated pipeline up the river banks but that pipeline infrastructure be constructed underneath the dense tree canopy. • No individuals of the two nationally protected tree species are to be removed during the pipeline construction phase and the pipeline route is to be diverted around any individuals of these two species if encountered. • Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan during the construction and operational phases. Such a management plan must be compiled by a suitably qualified and experienced ecologist. • An additional ecological walkthrough is to be conducted prior to the commencement of the project during the flowering period of underground bulbous plant species. • 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: Transformation of a Critical Biodiversity Area one (CBA 1) and Ecological Support Area (ESA) associated with the assessment area	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	0	0	0	0	4	4	2
Duration:	0	0	0	0	4	3	1
Extent:	0	0	0	0	3	2	1

Irreplaceable:	0	0	0	0	4	4	1
Reversibility:	0	0	0	0	3	3	2
Probability:	0	0	0	0	3	3	2
Total SP:	0	0	0	0	54	48	14
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• The new 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. • The areas surrounding the pump station and pipeline route must be adequately rehabilitated as soon as practically possible after construction. • A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced ecologist						

Nature of impact: Destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	8	4	8	4	4	2	2
Duration:	4	4	4	4	4	2	1
Extent:	3	2	3	2	2	2	1
Irreplaceable:	3	3	3	3	3	1	1
Reversibility:	4	4	4	4	4	2	2
Probability:	5	3	5	3	3	3	2
Total SP:	110	51	110	51	51	27	14
Significance rating:	High (H)	Medium (M)	High (H)	Medium (M)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan during the construction and operational phases. Such a management plan must be compiled by a suitably qualified and experienced ecologist. • Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent significant alien invasive species establishment.						

	• The areas surrounding the pump station and pipeline route must be adequately rehabilitated as soon as practically possible after construction. • Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced ecologist. • Natural veld situated in-between the proposed cultivated lands must not be impacted upon and must be left undeveloped						
Nature of impact: Terrestrial alien invasive species establishment			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	4	6	4	4	4	2
Duration:	4	3	4	3	4	3	1
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	1	1
Reversibility:	2	2	2	2	2	1	2
Probability:	4	2	4	2	4	2	2
Total SP:	64	26	64	26	56	22	14
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan during the construction and operational phases. Such a management plan must be compiled by a suitably qualified and experienced ecologist. • Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent significant alien invasive species establishment. • The areas surrounding the pump station and pipeline route must be adequately rehabilitated as soon as practically possible after construction. • A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced ecologist. • Natural veld situated in-between the proposed cultivated lands must not be impacted upon and must be left undeveloped						
Potential Fauna and Avifauna Impacts:							
Nature of impact: Direct impact on Fauna and Avifauna as a result of vegetation clearance.			**Activity:** Proposed development of forage crops				
	Preferred Layout Alternative		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	6	4	6	4	2
Duration:	3	3	3	3	3	3	2
Extent:	2	2	2	2	1	1	1
Irreplaceable:	3	3	3	3	4	4	1
Reversibility:	3	3	3	3	3	3	1
Probability:	4	4	4	4	3	3	1
Total SP:	68	60	68	60	51	45	7
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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 cultivated 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. • Adequately cordon off the construction area and ensure that no construction activities, machinery or equipment operate or impact within the natural surrounding areas outside the cordoned off area. • No site construction camps to be established within the surrounding natural areas outside the project footprint areas. • It is recommended that a development line must be drawn through the assessment area and no development should be allowed to take place north of this line. • It is recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible. • The pump station, pipeline route and surrounding areas must be adequately rehabilitated as soon as practically possible after construction.						
Potential Dust Impacts:							
Nature of impact: Dust nuisance generated during the development / preparation of the forage crops.			**Activity:** Proposed development of forage crops				
	Preferred Layout Alternative		**Layout Alternative 2**		**Pump station and Pipeline route**	**No-Go Alternative**	

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	6	4	4	2	2
Duration:	2	2	2	2	2	2	2
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	4	2	4	2	4	2	2
Total SP:	56	22	56	22	48	18	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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. • Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent significant dust emissions.						

Potential Noise Impacts:	
Nature of impact: Noise nuisance generated during the development / preparation of the forage crops.	**Activity:** Proposed development of forage crops

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		Pump station and Pipeline route		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2	2	2
Duration:	2	2	2	2	2	2	2
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	2	2	2	2	2	2	2
Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	0
Duration:	2	1	2	1	2	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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.

Potential Surface and Groundwater Contamination Impacts:

Nature of impact: Surface and Groundwater Contamination during the development / preparation of cultivated lands – especially the impeding and contamination of the flow regimes of the significant ephemeral watercourses	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	8	4	8	4	6	4	0
Duration:	2	2	2	2	2	2	0
Extent:	3	2	3	2	3	2	0
Irreplaceable:	4	3	4	3	4	3	0
Reversibility:	4	2	4	2	4	2	0
Probability:	4	2	4	2	4	2	0
Total SP:	84	26	84	26	76	26	0
Significance rating:	Medium High (M)	Low (L)	Medium High (M)	Low (L)	Medium High (M)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)

Proposed Mitigation:	• 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. • Irrigation and fertilisation practices must be adequately managed in order to prevent over-fertilisation or over-irrigation which could lead to significant leaching and contamination of groundwater. A suitably qualified and experienced agricultural specialist must be consulted in order to advise on appropriate management practices. • The recommended buffer zone around the ephemeral watercourses must be adequately maintained and no development footprint is allowed to encroach into the buffer zone over time. • Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phases. This must be done to ensure and sufficiently manage storm water runoff, clean/dirty water separation towards the ephemeral watercourses in order to maintain their ecological functionality and integrity. • The initial design of the installed pipeline which prevents impact or impediment of the significant number of small drainage lines and subsequent local surface water drainage towards the ephemeral watercourse, must be adequately maintained over time. • If hydrocarbons or other chemicals are to be stored on site during the operational phase, the storage areas must be situated as far away as practicably possible from the ephemeral watercourses. • Hydrocarbon and other chemical storage areas must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units. • Adequate hydrocarbon and other chemical storage, handling, usage emergency spill procedures must be developed and all relevant construction personnel must be sufficient trained on- and apply these procedures during the entire construction phase.

Potential Waste Management Impacts:

Nature of impact:	**Activity:**
Waste impacts by means of waste storage and littering during the development / preparation of the cultivated lands.	Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	2
Duration:	2	2	2	2	2	2	2
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	2	2	2	2	2	2	2

Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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.						

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 cultivated lands.	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	0
Duration:	2	1	2	1	2	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Proposed Mitigation:	• 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 cultivated lands.	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	0
Duration:	1	1	1	1	1	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)

Proposed Mitigation:	• 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 forage crops

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		Pump station and Pipeline route		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	0	2	0	2	0	0
Duration:	1	1	1	1	1	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	1	0	1	0	1	0	1
Probability:	2	1	2	1	2	1	1
Total SP:	14	3	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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.						
Potential Soil Erosion Impacts:							
Nature of impact: Increased Soil erosion due to construction activities.			**Activity:** Proposed development of forage crops				

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		Pump station and Pipeline route		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	6	4	4	4	0

Duration:	4	1	4	1	4	1	1
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	2	2	1	2	1	1
Probability:	3	1	3	2	3	2	1
Total SP:	48	20	48	20	42	20	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	• 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. • Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phases. • Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent significant erosion.						

Potential Visual Impacts:							
Nature of impact: Increased visual impact due to increased working activities on-site.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	0	2	0	2	0	0
Duration:	1	1	1	1	1	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	1	0	1	0	1	0	1
Probability:	2	1	2	1	2	1	1

Total SP:	14	3	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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 forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	8	6	8	6	8	8
Duration:	1	1	1	1	1	1	1
Extent:	2	2	2	2	2	2	2
Irreplaceable:	2	2	2	2	2	2	2
Reversibility:	2	2	2	2	2	2	2
Probability:	4	5	4	5	4	5	4
Total SP:	52	75	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)
Proposed Mitigation:	• 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 continuous vegetation clearance.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	6	4	4	2	2	2
Duration:	5	5	5	5	5	5	1
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	3	3	3	3	3	3	2
Total SP:	51	48	45	42	39	36	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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 cultivated 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.						
Potential Fauna and Avifauna Impacts:							
Nature of impact: Continuous impact on Fauna and Avifauna as a result of cleared vegetation / habitat loss.				**Activity:** Proposed development of forage crops			
	Preferred Layout Alternative		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	6	4	4	2	2	2
Duration:	5	5	5	5	5	5	1
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	3	3	3	3	3	3	2
Total SP:	51	48	45	42	39	36	14
Significance rating:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• Natural veld situated in-between the proposedcultivated landsmust 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.						

Potential Dust Impacts:							
Nature of impact: Dust nuisance generated during the operational phase of the project.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	4	6	2	2	2	2
Duration:	3	2	3	2	2	2	2
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	4	2	4	2	2	2	2
Total SP:	60	22	60	22	24	18	16
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)

Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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. • Cultivated landsneed to be rehabilitated by planting buffalo grass when not in use.						
Potential Noise Impacts:							
Nature of impact: Noise nuisance generated during the operational phase of the forage crop establishment.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	2
Duration:	2	2	2	2	2	2	2
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	2	2	2	2	2	2	2
Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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 forage crops				
	Preferred Layout Alternative		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2	2	0
Duration:	2	1	2	1	2	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	1	1	1	1	1	1	1
Reversibility:	1	1	1	1	1	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	7	6	7	6	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Proposed Mitigation:	• 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.						

Potential Surface and Groundwater Contamination Impacts:							
Nature of impact: Surface and Groundwater Contaminationduring the operational phase by means of fertilizer and/or any other hazardous substances or pesticides specifically the continued impeding and contamination of the flow regimes of the significant ephemeral watercourses			**Activity:** Proposed development of forage crops				

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		Pump station and Pipeline route		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	8	4	8	4	6	4	0
Duration:	3	2	3	2	3	2	0
Extent:	3	2	3	2	3	2	0
Irreplaceable:	4	3	4	3	4	3	0
Reversibility:	4	2	4	2	4	2	0
Probability:	4	2	4	2	4	2	0
Total SP:	88	26	88	26	80	26	0
Significance rating:	Medium High (MH)	Low (L)	Medium High (MH)	Low (L)	Medium High (MH)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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. • Irrigation and fertilisation practices must be adequately managed in order to prevent over-fertilisation or over-irrigation which could lead to significant leaching and contamination of groundwater. A suitably qualified and experienced agricultural specialist must be consulted in order to advise on appropriate management practices. • 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. • The recommended buffer zone around the ephemeral watercourses must be adequately maintained and no development footprint is allowed to encroach into the buffer zone over time. • Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phases. • The recommended buffer zone around the ephemeral watercourses must be adequately maintained and no development footprint is allowed to encroach into the buffer zone over time.						

	• Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phases. This must be done to ensure and sufficiently manage storm water runoff, clean/dirty water separation towards the ephemeral watercourses in order to maintain their ecological functionality and integrity. • The initial design of the installed pipeline which prevents impact or impediment of the significant number of small drainage lines and subsequent local surface water drainage towards the ephemeral watercourse, must be adequately maintained over time. • If hydrocarbons or other chemicals are to be stored on site during the operational phase, the storage areas must be situated as far away as practicably possible from the ephemeral watercourses. • Hydrocarbon and other chemical storage areas must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units. • Adequate hydrocarbon and other chemical storage, handling, usage emergency spill procedures must be developed and all relevant construction personnel must be sufficient trained on- and apply these procedures during the entire construction phase.

Potential Waste Management Impacts:

Nature of impact: Waste impacts by means of waste storage and littering during the operational phase of the cultivated lands .	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	2
Duration:	2	2	2	2	2	2	2
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	2
Probability:	2	2	2	2	2	2	2
Total SP:	24	18	24	18	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)

Proposed Mitigation:	• 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 cultivated lands.			**Activity:** Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	0
Duration:	2	1	2	1	2	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	9	6	9	6	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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 cultivated lands .			**Activity:** Proposed development of forage crops				
	Preferred Layout Alternative		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	2	2	2	2	2	2	0
Duration:	2	1	2	1	2	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	1	1	1	1	1	1	1
Reversibility:	1	1	1	1	1	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	7	6	7	6	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	• 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 forage crops

Evaluation Component:	Preferred Layout Alternative		Layout Alternative 2		Pump station and Pipeline route		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	4	6	4	2	0	0
Duration:	4	2	4	2	1	1	1
Extent:	3	2	3	2	2	1	1
Irreplaceable:	4	3	4	3	1	1	1
Reversibility:	4	2	4	2	1	1	1
Probability:	4	2	4	2	1	4	1

Total SP:	84	26	84	26	7	4	4
Significance rating:	Medium High (MH)	Low (L)	Medium High (MH)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Proposed Mitigation:	• 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 forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	4	2	4	2	4	2	0
Duration:	1	1	1	1	1	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	1	1	1	1	1	1	1
Probability:	2	1	2	1	2	1	1
Total SP:	20	6	20	6	20	6	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)

Proposed Mitigation:	• 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. • Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent significant erosion.

Potential Visual Impacts:

Nature of impact: Increased visual impact due to increased working activities during the operational phase.	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	0	2	0	2	0	0
Duration:	1	1	1	1	1	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	1	0	1	0	1	0	1
Probability:	2	1	2	1	2	1	1
Total SP:	14	3	14	3	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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 forage crops

	Preferred Layout Alternative	**Layout Alternative 2**	**Pump station and Pipeline route**	**No-Go Alternative**

Evaluation Component:	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Magnitude:	6	8	6	8	6	8	8
Duration:	1	1	1	1	1	1	1
Extent:	2	2	2	2	2	2	2
Irreplaceable:	2	2	2	2	2	2	2
Reversibility:	2	2	2	2	2	2	2
Probability:	4	5	4	5	4	5	4
Total SP:	52	75	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)
Proposed Mitigation:	• 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

DECOMMISIONING PHASE							
Potential Dust Impacts:							
Nature of impact: Dust nuisance generated during the decommissioning phase of the project.				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	4	4	2	2	2	2
Duration:	1	1	1	1	1	1	2
Extent:	2	2	2	2	2	2	1

Irreplaceable:	1	1	1	1	1	1	1
Reversibility:	2	1	2	1	2	1	2
Probability:	2	2	2	2	2	2	2
Total SP:	24	18	20	14	16	14	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• Dust Management measures must be implemented in order to manage and minimize undesired dust emissions. • Access roads and cultivation areas to be decommissioned are to be ripped and seeded for vegetation regrowth to avoid dust. • Cultivated areas need to be rehabilitated after or when not in use by planting buffalo grass.						

Potential Surface and Groundwater Contamination Impacts:	
Nature of impact: Surface and Groundwater Contaminationduring the decommissioning phase by means of fertilizer and/or any other hazardous substances or pesticides.	**Activity:** Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	0	2	0	2	0	0
Duration:	1	1	1	1	1	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	1	1	1	1	1	1	1
Reversibility:	1	1	1	1	1	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	7	4	7	4	7	4	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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:	**Activity:**
Waste impacts by means of waste storage and littering during the decommissions phase of the cultivated lands .	Proposed development of forage crops

Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	2	2	2	2	2	2
Duration:	1	1	1	1	1	1	2
Extent:	1	1	1	1	1	1	1
Irreplaceable:	1	1	1	1	1	1	1
Reversibility:	1	1	1	1	1	1	2
Probability:	1	1	1	1	1	1	2
Total SP:	6	6	6	6	6	6	16
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Proposed Mitigation:	• 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:	**Activity:**

Increased Soil contamination by means of hazardous substances.			Proposed development of forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	2	0	2	0	2	0	0
Duration:	1	1	1	1	1	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	1	1	1	1	1	1	1
Reversibility:	1	1	1	1	1	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	7	4	7	4	7	4	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	• 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 forage crops				
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	4	4	2	2	2	0
Duration:	2	2	2	2	2	2	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	2	1	2	1	2	1	1
Total SP:	26	9	22	7	18	7	4

Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)
Proposed Mitigation:	• 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: Decreased socio-economic conditions due to job loss				**Activity:** Proposed development of forage crops			
Evaluation Component:	**Preferred Layout Alternative**		**Layout Alternative 2**		**Pump station and Pipeline route**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	**Before Mitigation**	**After Mitigation**	**Before Mitigation**	**After Mitigation**	
Magnitude:	6	4	4	2	2	2	6
Duration:	3	2	3	2	3	2	1
Extent:	3	3	3	3	3	3	2
Irreplaceable:	2	1	2	1	2	1	2
Reversibility:	2	2	2	2	2	2	2
Probability:	2	2	2	2	2	2	4
Total SP:	32	24	28	20	24	20	52
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	+ Medium (M)
Proposed Mitigation:	• 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 largest portion of areas surrounding the proposed development area are mainly used for sheep and other livestock farming due to the climate being unfavourable for the production of crops. There are therefore not a lot of cultivated areas in the vicinity, specifically directly adjacent or in close proximity to the proposed development area. However, there are a few pivots close to the banks of the Orange River, which is approximately 5 - 6 km away from the midpoint of the area. The majority of the area is however 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 10.2.

The cumulative effects of most of the identified impacts are regarded as low to medium.

9.6 PREFERRED ALTERNATIVE CONCLUDING STATEMENT

In identifying, evaluating and comparing impacts associated with the proposed forage crop establishment and considered alternatives as well as financial and logistic feasibility, It is the opinion of the EAP that the potentially significant ecological impacts associated with the contamination and impeding of the flow regimes of the significant ephemeral watercourses as well as destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area, can be suitably reduced and mitigated to within acceptable residual levels. The project should therefore be considered by the competent authority for environmental authorisation and approval.

The largest area is occupied by the Hutton soil form, which is sandy, apedal and well drained. Soils with inadequate drainage also occur, such as the shallower Glenrosa and Mispah soil forms, and the Plooysburg soil form, which has an accumulation of lime in the subsoil. The chemical and physical laboratory analysis indicate that the soils sampled are suitable for irrigation. In total 376 ha of the area is deemed suitable for irrigation. This includes an area of 106 ha which is slightly shallower and should only be used to fit centre pivots. Forty-five hectares of shallow soils also occur, which is mostly the Plooysburg soil form which occurs to the south of the site.

Although Alternative 2 will result in the transformation of an approximately 11.2 ha smaller footprint area (total of 206.34 ha) relative to Alternative 1 (total of 217.54 ha), there is no significant difference in ecological impact ratings between the two alternatives. It is recommended that Alternative 2 rather be considered due to its slightly smaller impact footprint but either alternatives should prove to be acceptable for development.

The proposed development may however only continue if all recommended mitigations measures as per this 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

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

The mechanical clearance and soil preparation associated with the proposed agricultural development will in all probability completely transform the majority of the existing surface vegetation on the assessment area.

Both the Northern Upper Karoo (NKu 3) and Lower Gariep Broken Veld (NKb 1) vegetation types associated with the assessment area, are classified as least threatened as very little has been transformed thus far (SANBI, 2006-). The majority of the assessment area as well as the entire pipeline route is further categorised as 'Other Natural Area' (ONA) while only a very small portion in the south-eastern corner of the assessment area falls within an Ecological Support Area (ESA) in accordance with the NCPSBP, which sets out biodiversity priority areas in the province. The location of the pump station on the banks of the Orange River falls within a Critical Biodiversity Area one (CBA 1) in accordance with the NCPSBP.

The assessment area is in a natural pristine condition and scored a very high PES value. The broader areas surrounding the assessment area, which are associated with the relevant vegetation types, are extremely vast and also largely natural and undeveloped. The size of the proposed development is therefore small relative to the surrounding natural region.

Although no Red Data Listed species of conservational significance were found to be present within the assessment area, the provincially protected species *Euphorbia burmannii* & *Aloe claviflora* were encountered within the rocky ridge outcrops. It is therefore recommended that a representative portion of the rocky ridge outcrops should be adequately buffered out of the proposed development footprint area if practicably possible. It is also expected that the assessment area will house a number of provincially protected bulb species. It is therefore further recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulb plant species. This will ensure that no provincially protected or significant species have potentially been omitted.

Furthermore, tree and shrub individuals of the nationally protected species *Boscia albitrunca* & *Vachellia erioloba* are sparsely scattered throughout the southern and central portions of the assessment area. Approximately ≤ 85 *Boscia albitrunca* individuals and ≤ 180 *Vachellia erioloba* individuals are present within these southern and central portions. The majority of individuals of the latter species are however still relatively small (≤ 3.5 m in height) within the southern and central portions.

The densities of these two nationally protected species however increase significantly within the northern portion of the assessment area and a high number of large mature individuals (≥ 7 m in height) of the species *Vachellia erioloba* are present there. Approximately ≤ 200 *Boscia albitrunca* individuals and ≤ 450 *Vachellia erioloba* individuals are present within the northern portion. Due to the presence of this well-established woody component within the northern portion, the area subsequently also houses numerous large congregated nests of sociable weavers (*Philetairussocius*) which is a provincially protected species. The area is also utilised by various raptor- and other predatory bird species for breeding, foraging and persistence purposes. The northern portion of the assessment area is therefore viewed as being of relatively high conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and nationally protected tree species.

Due to the significant presence of the two nationally protected tree species within the northern portion of the assessment area, together with the area's distinctly associated avifaunal ecology, it is recommended that a theoretical development line must be drawn through the assessment area and no development should be allowed to take place north of this line. If development north of the line is still considered by the applicant, it would highly likely require the investigation and implementation of a suitable Biodiversity Offset as part of the NEMA mitigation hierarchy. A comprehensive Biodiversity Offset Feasibility Assessment and Report would therefore need to be conducted and compiled in order to identify and inform on potential areas of suitable size and similar ecological value which could meaningfully contribute to the provincial and national biodiversity targets and conservation strategies. The proposed Biodiversity Offset Feasibility Assessment and Report will have to be evaluated by the relevant competent authorities in order to inform on their approval/rejection process. It is recommended that the Department of Agriculture, Forestry and Fisheries be informed of the application as an Interested & Affected Party during the Public Participation Process in order for them to provide comment and recommendations in this regard.

Although the additional approximately 11.2 ha portion associated with Alternative 1 is situated north of the recommended development line, the location of this additional portion has specifically been chosen in an area with a lower tree density and few large mature individuals of the species *Vachellia erioloba* (≤ 15) relative to the rest of the area north of the development line. The development within this additional portion will therefore not result in the removal of a significant number of nationally protected tree individuals and should not necessarily impact significantly on the continued ecological functionality and connectivity of the broader ecosystem north of the development line.

Individuals of the two nationally protected tree species are also sparsely scattered along the pipeline route. No individuals of the two nationally protected tree species are to be removed during the pipeline construction phase and the pipeline route is to be diverted around any individuals of these two species if encountered.

The ephemeral watercourses which traverse the assessment area, form an important part of the mid to upper region of a quaternary surface water catchment and drainage area which regionally drains towards the south and eventually discharges into the Orange River situated approximately 3.2 km south of the assessment area. The ephemeral watercourses are therefore viewed as being of relatively high conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type and the surface water catchment and drainage area. It is therefore recommended that the ephemeral watercourses be adequately buffered out of the proposed development footprint and that no significant development is allowed to take place within the buffer zone.

A significant number of small drainage lines feed into the directly adjacent ephemeral watercourse all along the length of the proposed pipeline route. The local catchment and drainage all along the length of the pipeline route towards the ephemeral watercourse, could therefore be significantly impeded by the construction of the aboveground pipeline. Construction and design of the proposed pipeline should take into account the significant number of small drainage lines and the pipeline must be installed in a manner so as not to permanently impact or impede on the local surface water drainage towards the ephemeral watercourse.

It is the opinion of the specialist that the potentially significant ecological impacts associated with the contamination and impeding of the flow regimes of the significant ephemeral watercourses as well as destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area, can be suitably reduced and mitigated to within acceptable residual levels. The project should therefore be considered by the competent authority for environmental authorisation and approval.

Although Alternative 2 will result in the transformation of an approximately 11.2 ha smaller footprint area (total of 206.34 ha) relative to Alternative 1 (total of 217.54 ha), there is no significant difference in ecological impact ratings between the two alternatives. It is recommended that Alternative 2 rather be considered due to its slightly smaller impact footprint but either alternatives should prove to be acceptable for development.

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. The proposed project area is of ecological significance due to the presence of nationally and provincially protected species. 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 was 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 the opinion of the EAP that the potentially significant ecological impacts associated with the contamination and impeding of the flow regimes of the significant ephemeral watercourses as well as destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area, can be suitably reduced and mitigated to within acceptable residual levels. The project should therefore be considered by the competent authority for environmental authorisation and approval.

Although Alternative 2 will result in the transformation of an approximately 11.2 ha smaller footprint area (total of 206.34 ha) relative to Alternative 1 (total of 217.54 ha), there is no significant difference in ecological impact ratings between the two alternatives. It is recommended that Alternative 2 rather be considered due to its slightly smaller impact footprint but either alternatives should prove to be acceptable for development.

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, hardcopies of the report were made available at the Siyancuma local Municipality. A downloadable version is available on the Eco-Con Environmental website: http://www.eco-con.co.za/projects/ under the name Bultfontein Agricultural Development.

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