ECO-CON ENVIRONMENTAL

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ENVIRONMENTAL MANAGEMENT PLAN

NEMA Section 24G Rectification Process for the already established 4 X circular agricultural pivots to a total of approximately 100ha on the Remaining Extent of the Farm New Waterford no. 229 and Portion 2 of the Farm New Waterford no. 229 near Hopetown, Northern Cape Province

31 January 2018

Prepared for:

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DEFINITIONS AND TERMMINOLOGY

Alternatives	Different mechanisms for achieving the general purpose and need of the proposed activity or development. Alternatives may be in terms of location, activity, processes, timing, or "do nothing" (i.e. "no-go" option).
Assessment	The evaluation, judgement, organising, rating, interpreting and communicating information which is relevant.
Biota	The animal and plant life of a particular region, habitat or ecosystem.
Construction activity	Any action taken by the Contractor, his subcontractors, suppliers or personnel in undertaking the construction work, otherwise referred to as "Works"
Construction area(s)	All areas used by the Contractor in order to carry out the required construction activities. This includes all offices, accommodation facilities, testing facilities / laboratories, batching areas, storage & stockpiling areas, workshops, spoiling areas, access roads, traffic accommodation (e.g. bypasses), etc.
Applicant/Employer	The person applying for Environmental Authorisation or carrying out the activity. The person or legal entity that has made application to the competent authority for environmental authorizations and who will have the overall responsibility to adhere to the relevant legislation and comply with the environmental authorization.
Ecosystem	A biological community of interacting organisms (plants and animals) and their physical environment.
Endangered species	A species of plant or animal which has been categorised by the International Union for Conservation of Nature (IUCN) Red Data List as likely to become extinct.
Endemic	A plant or animal species that is native or restricted to a certain area or range.
Environment	The surroundings within which humans exist and that are made up of – • land, water and atmosphere; • micro-organisms, plant and animal life; • any part or combination of the above and the interrelationships among and between them;

- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation	The permission required from the competent authority for an activity as listed according to the NEMA regulations.
Environmental Impact	Any change to the environment, whether desirable or undesirable, that would result directly or indirectly from any construction activity.
Environmental Management	Ensuring that environmental concerns are included in all stages of development in order to ensure that the proposed activity or development is done in a sustainable manner and does not exceed the carrying capacity of the surrounding local environment.
Hazardous material / substances	Any waste that contains organic or inorganic elements or compounds, that may, owing to its inherent physical, chemical or toxicological characteristics, have a detrimental impact on health and the environment.
Indigenous	A “native” species of plant or animal that occurs naturally in a particular place or region, and was not artificially or intentionally introduced.
Invasive Alien Plants	All undesirable vegetation, defined as but not limited to, all declared category 1 and category 2 plants in terms of the National Environmental Management: Biodiversity Act 2014 (Act 10 of 2004), as amended.
Local Authority	Otherwise referred to as the “Council” – the local municipal authority that operates or is responsible in said area.
Rehabilitation	Returning an area impacted by activities/works to its original or better condition prior to the impacts from the activities/works having occurred.
Significant impact	An impact that may, but its magnitude, duration, intensity, or probability, have a notable effect on one or more aspects of the environment.

ABREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
DESTEA	Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs
DEA	Department of Environmental Affairs
DW&S	Department of Water & Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP/EMPr	Environmental Management Programme
ER	Employer's Representative
ESA	Ecological Support Area
SAHRA	South African Heritage Association
I&AP	Interested and Affected Party
IAP	Invasive Alien Plants (please see definition above)
MS	Method Statement
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act (Act No. 107 of 1998) as amended
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEM:WA	National Environmental Management Waste Act (Act No. 59 of 2008), as amended
NHRA	National Heritage Resources Act (Act No. 25 of 1998)
NWA	National Water Act (Act 36 of 1998), as amended
PPC&E	Personal Protective Clothing and Equipment
SDF	Spatial Development Framework
RDB	Red Data Book
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute

WULA Water Use Licence Application - in terms of the National Water Act 1998 (Act 36 of 1998)

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1. INTRODUCTION

The applicant, Mr. Pieter Louw, has developed four (4) cultivated circular pivot lands (100ha) on the Remaining Extent of the Farm New Waterford no. 229 and Portion 2 of the Farm New Waterford no. 229 near Hopetown, as well as two water extraction points in the Orange River for which environmental authorisation was not previously obtained from the Northern Cape Department of Environment and Nature Conservation (DENC). The applicant has become aware of this transgression and has opted to follow a Section 24G rectification process in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA).

The Environmental Management Plan aims to present management measures that will eliminate, offset or reduce adverse environmental impacts, as well as to provide a framework for environmental monitoring. The primary purpose of the Environmental Management Plan is to ensure that negative environmental impacts of the project are effectively managed within acceptable limits and that the positive impacts are enhanced. In order to give full effect to the Environmental Management Plan, it must form part of the contractual agreement between the relevant contractor(s) and the developer.

1.1 Legislative requirements

Regulation 19(4) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 provides the content requirements for Environmental Management Programmes. The table below lists the relevant requirements, indicates whether the relevant information is included in this report or not, and provides cross-references as to where the relevant information can be found in this report.

Table 1: EMP Requirements and content

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
(a)	(1) An EMPr must comply with section 24N of the Act and include- (a) details of - (i) the EAP who prepared the EMPr; and	**Yes**	**Chapter 2**
	(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae	**Yes**	**Chapter 2**
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	**Yes**	**Chapter 9**
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	**Yes**	**Chapter 3**
(d)	a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	**Yes**	**Chapter 9**

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
	(i) planning and design;	**Yes**	**Chapter 9**
	(ii) pre-construction and construction activities;	**Yes**	**Chapter 9**
	(iii) construction activities;	**Yes**	**Chapter 9**
	(iv) rehabilitation of the environment after construction and where applicable post closure; and	**Yes**	**Chapter 11**
	(v) where relevant, operation activities;	**Yes**	**Chapter 9**
(e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	**Yes**	**Chapter 3 and 11**
(f)	a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	**Yes**	**Chapter 9**
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	**Yes**	**Chapter 9**
	(ii) comply with any prescribed environmental management standards or practices;	**Yes**	**Chapter 9**
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	**Yes**	**Chapter 9**
	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	**Yes**	**Chapter 9**
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Yes**	**Chapter 5, 6 and 9**
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Yes**	**Chapter 9**
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	**Yes**	**Chapter 9**
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	**Yes**	**Chapter 9**
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	**Yes**	**Chapter 9**
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	**Yes**	**Chapter 9**
(m)	an environmental awareness plan describing the manner in which-		
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	**Yes**	**Chapter 8**
	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	**Yes**	**Chapter 8**

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
(n)	any specific information that may be required by the competent authority.	N/A	

2. ENVIRONMENTAL ASSESSMENT PRACTIRIONER

The National Environmental Management Act, Act 1998 stipulates that an Independent Environmental Assessment Practitioner need to be appointed for the compilation of the Environmental Management Plan. This Environmental Management Plan was prepared by Mr. Johan Botes from Eco-Con Environmental. The sections below provide the detail of the EAP and explain the EAP's expertise to prepare this Environmental Management Plan.

2.1 Details of the EAP

Table 2: Details of the EAP

Company Name	Eco-Con Environmental (Pty) Ltd.
Individuals Name:	Mr. Johan Botes
Physical address:	9 Gascony Crescent, Helicon Heights, Bloemfontein, 9300
Postal address:	P.O. Box 29262, Danhof, Bloemfontein, 9310
Telephone:	+27 (0)51 436 1251
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E-mail:	johan@eco-con.co.za
EAP Qualifications:	B.A Honours in Geography - UFS B.A Geography and Environmental Management - UFS
EAP Registrations:	IAIA`sa: 4043 SAGIC: 1032

2.2 Expertise of the EAP

The experience of the EAP can be summarised under different sub-sections as outlined below:

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.

3. PROJECT DESCRIPTION

The applicant, Mr. Pieter Louw, has developed four (4) cultivated circular pivot lands (100ha) on the Remaining Extent of the Farm New Waterford no. 229 and Portion 2 of the Farm New Waterford no. 229 near Hopetown, as well as two water extraction points in the Orange River for which environmental authorisation was not previously obtained from the Northern Cape Department of Environment and Nature Conservation (DENC). The applicant has become aware of this transgression and has opted to follow a Section 24G rectification process in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA).

Two of the pivots (pivots number 7 and 8) are 20 hectares and the remaining two pivots (pivots number 11 and 12) are 30 hectares. These pivots are primarily being utilised for the planting of maize during the months of December until June and Wheat from July to November. Cotton seed and Soya seeds are also planted on these pivots on a crop rotation cycle in order to maintain soil fertility quality.

Also established are two water pipelines extracting water from the Orange river for irrigation purposes. The first pipeline (as per coordinates above) is for irrigation of the four pivots being applied for in this impact assessment report. The pipeline is currently 300mm in diameter and stretch a total distance of 1.3km to the existing dam. The applicant will however upgrade the current pipeline to a 500mm diameter pipeline in order to accommodate for the additional water which is being purchased at the moment. From the dam, water is being extracted and fed to the respective pivot areas for irrigation.

The second pipeline (as per coordinates above) is an existing 500mm pipeline extracting water from the orange river to the onsite settling dam over a distance of 500 meters. The pivots for whish this water is extracted are not being applied for as they were established prior to the environmental legislation being put in place. However, the pipeline is a new pipeline and therefore being applied for.

Already established farm roads are already in place which link up with the pivots.

Figure 1: Pivots applied for

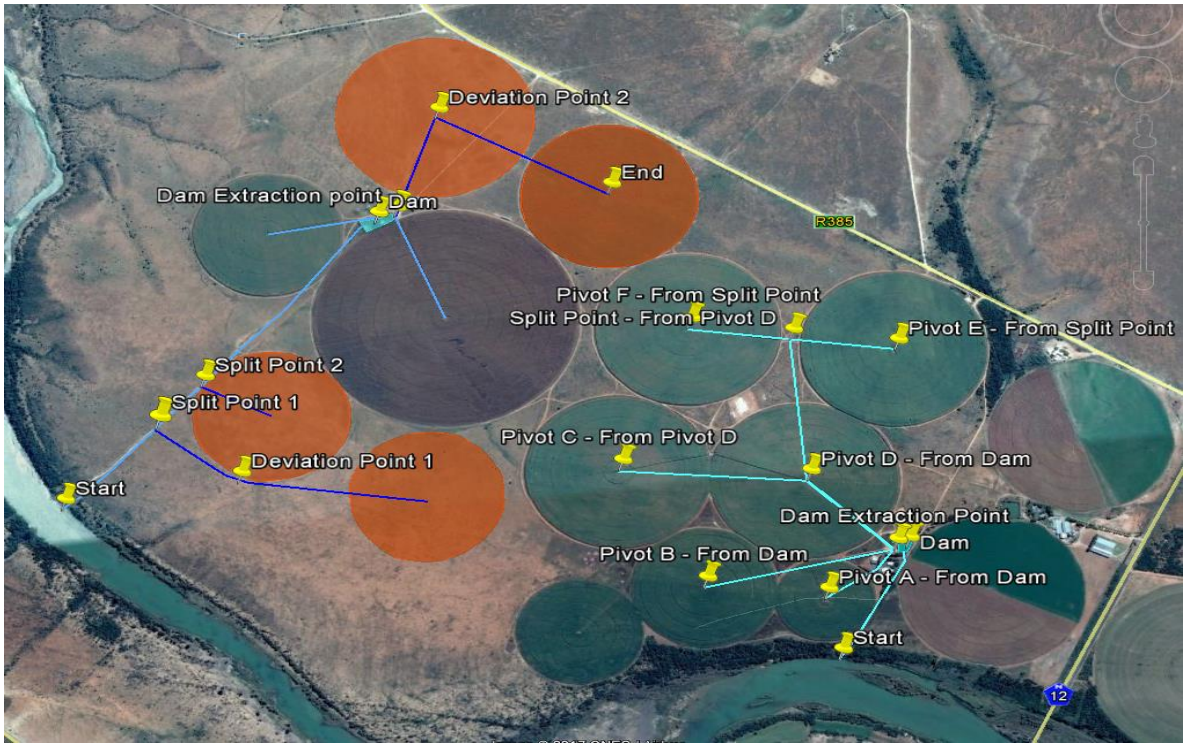

Figure 2: Established Pipeline routes

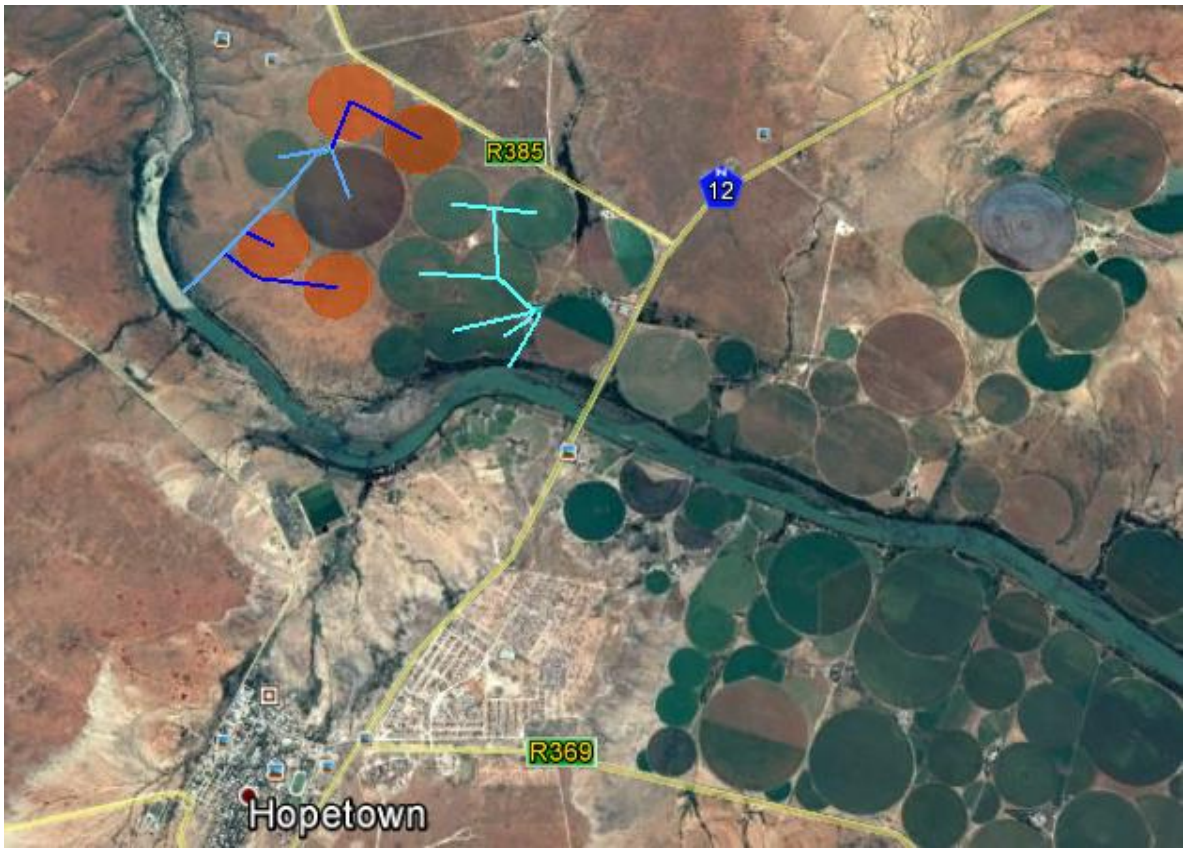

Figure 3: Project Location

3.1. Project Phases

As the Pivots and the pipelines are already established, this document will include the EMP for the operational phase of the project. Should the applicant wish to decommission the project, an additional Impact assessment with EMPr should be compiled which is in line with the NEA listed activities.

Operational Phase

- The operational phase of the project will involve the continuous replanting of Wheat, Maize, Soya seeds and Cotton Seeds during their respective seasons, as well as the continuous maintenance of the pipeline and pivot areas.

3.2. Listed activities triggered

This proposed project triggered the following listed activities in terms of the National Environmental Management Act, 1998 and the Environmental Impact Regulation of 2014 as amended in 2017.

Table 3: NEMA Listed Activities triggered

Regulation	Activity	Description of trigger activity in proposed project
GN. R. 983 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	The water pipeline and water pump extracting water from the Orange River, and the extraction pump infrastructure and building exceeding 100m^2 is located within 32 meter of the orange river which is regarded as a watercourse.
GN. R. 983 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 water pipeline and water pump extracting water from the Orange River, and the extraction pump infrastructure and building exceed the 10m^3 within the watercourse.
GN. R. 984 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.	The already developed four (4) agricultural pivots cover a total area of 100 hectares.

Regulation	Activity	Description of trigger activity in proposed project
GN. R. 984 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.	The already developed four (4) agricultural pivots cover a total area of 100 hectares.
GN. R. 985 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	Although the two vegetation types associated with the development are merely classified as least threatened, the entire terrestrial assessment area associated with the four pivot lands falls within a Critical Biodiversity Area two (CBA 2) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan.
GN. R. 985 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- (G) 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 entire terrestrial assessment area associated with the water extraction pump falls within a Critical Biodiversity Area two (CBA 2) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan.

4. EXISTING ENVIRONMENT AND IMPACT SUMMARY

The following sections provide for a summary of impact as identified during the Impact Assessment phase and also provide for a description of the baseline environment.

4.1 Baseline Environment

According to Mucina & Rutherford (2006), all four pivot lands fall within the Kimberley Thornveld vegetation type (SVk 4) which is characterised by slightly irregular plains with a well-developed woody component (tree and shrub layer). The herbaceous layer is usually open with much uncovered soils. Only the eastern edges of pivot lands numbers 7 & 12 fall 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. Both of these vegetation types are merely classified as least threatened because of their broad distributions and them being mostly excluded from being utilised for intensive agricultural cultivation activities (Mucina & Rutherford, 2006).

'Ground truthing' during the site visit however suggests that all four pivot lands rather fall within the Northern Upper Karoo vegetation type (NKu 3) as the entire project site and surrounding natural, undeveloped areas constitute shrubland, dominated by dwarf karoo shrubs and sparse grasses. No distinct woody component, associated with the Kimberley Thornveld vegetation type (SVk 4) is present on and around the project site and no distinct change in vegetation composition or soil structure is evident towards the west of the site which might have indicated a transition towards Kimberley Thornveld vegetation.

The two water extraction points form part of the Orange River riparian zone which is associated with the Upper Gariep Alluvial vegetation type (AZa 4). This vegetation type is classified as vulnerable due to significant transformation caused by cultivation activities and dam infrastructure development (Mucina & Rutherford, 2006).

Although the initially mentioned two vegetation types are merely classified as least threatened, the entire terrestrial assessment area associated with the four pivot lands falls within a Critical Biodiversity Area two (CBA 2) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan. The two water extraction points, associated with the Upper Gariep Alluvial Vegetation Type (AZa 4), fall within a Critical Biodiversity Area one (CBA 1). Critical Biodiversity Areas are areas which play an important role in conservation and reaching certain required biodiversity targets for ecosystem types, species or ecological processes (Collins, 2015).

The development of the four pivot lands and two water extraction points have however already completely transformed the majority of the surface vegetation on the footprint area.

4.2 Summary of Impacts

Below is a summary of impact evaluated during the Impact Assessment process:

Construction Phase Impacts: *(These impacts were calculated by means of the natural surrounding areas as if construction is yet to take place. The reason being: to give an indication of what impact the construction phase had on the natural environment).*

PLANNING, DESIGN AND CONSTRUCTION PHASE			
Potential Flora Impacts:			
Nature of impact: Direct impact on Flora as a result of vegetation clearance.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	65	55	55
Significance rating:	Medium (M)	Medium (M)	Medium (M)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)
Potential Fauna and Avifauna Impacts:			
Nature of impact: Direct impact on Fauna and Avifauna as a result of vegetation clearance.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Dust Impacts:			
Nature of impact: Dust nuisance generated during the development / preparation of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	28	22	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Noise Impacts:			
Nature of impact: Noise nuisance generated during the development / preparation of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Cultural and Heritage Impacts:			
Nature of impact:		**Activity:**	

Damage and destruction of vertebrate fossils during excavation activities.		Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:			
Nature of impact: Surface and Groundwater Contamination during the development / preparation of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	7	4	0
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Waste Management Impacts:			
Nature of impact: Waste impacts by means of waste storage and littering during the development / preparation of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Traffic Impacts:			
Nature of impact: Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Fire Risk Impacts:			
Nature of impact: Increase risk of fires during the development / preparation of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	

Total SP:	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)
Potential Soil Contamination Impacts:			
Nature of impact: Increased Soil contamination by means of hazardous substances.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Soil Erosion Impacts:			
Nature of impact: Increased Soil erosion due to construction activities.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	20	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)
Potential Visual Impacts:			
Nature of impact: Increased visual impact due to increased working activities on-site.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Socio-Economic Impacts:			
Nature of impact: Increased socio-economic conditions due to job creation		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	Medium (M)

Operational Phase Impacts:

OPPERATIONAL PHASE			
Potential Flora Impacts:			
Nature of impact: Direct impact on flora as a result of continuous vegetation clearance.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	65	55	55
Significance rating:	Medium (M)	Medium (M)	Medium (M)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)
Potential Fauna and Avifauna Impacts:			
Nature of impact: Continuous impact on Fauna and Avifauna as a result of cleared vegetation / habitat loss.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Dust Impacts:			
Nature of impact: Dust nuisance generated during the operational phase of the project.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	28	22	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Noise Impacts:			
Nature of impact: Noise nuisance generated during the operational phase of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Cultural and Heritage Impacts:			
Nature of impact: Damage and destruction of vertebrate fossils during the operational phase.		**Activity:** Already Established Wheat and Maize Pivot areas	

Evaluation Component:	Preferred Layout Alternative		No-Go Alternative
	Before Mitigation	After Mitigation	
Total SP:	7	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:			
Nature of impact: Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	7	4	0
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Waste Management Impacts:			
Nature of impact: Waste impacts by means of waste storage and littering during the operational phase of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	24	18	16
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Traffic Impacts:			
Nature of impact: Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	9	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Fire Risk Impacts:			
Nature of impact: Increase risk of fires during the operational phase of the pivots.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	7	6	4

Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Medium (M)	Medium (M)	Medium (M)
Potential Soil Contamination Impacts:			
Nature of impact: Increased Soil contamination by means of hazardous substances.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Soil Erosion Impacts:			
Nature of impact: Increased Soil erosion due to operational activities.		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	20	6	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	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:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	14	3	4
Significance rating:	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)
Potential Socio-Economic Impacts:			
Nature of impact: Increased socio-economic conditions due to job creation		**Activity:** Already Established Wheat and Maize Pivot areas	
Evaluation Component:	**Preferred Layout Alternative**		**No-Go Alternative**
	Before Mitigation	**After Mitigation**	
Total SP:	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	Medium (M)

Decommissioning Phase Impacts:

It is not foreseen that this project will be decommissioned as this is an existing profitable agricultural project. If in the future the applicant wishes to decommission the pivots and water pipelines, a new/separate Environmental Impact Assessment in line with the NEMA listed activities has to be undertaken, with an Environmental Management Plan, for the decommissioning phase of the project.

5. PERSONS RESONSIBLE FOR IMPLIMENTING THE EMP

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase.

The following stakeholders will be involved with the EMPr either during the construction phase, operational phase or both.

5.1 Competent Authority: DENC

DENC is the Northern Cape competent authority responsible for issuing environmental authorisations in term of NEMA, NEM:WA, NEM:BA. This Directorate has overall responsibility for ensuring that the Applicant complies with the conditions of its environmental authorisation as well as this EMPr once approved.

During the operational and decommissioning phases of the EMPr the lead authority will have the following role to play:

- Conduct ad hoc compliance inspections.
- Read the ECO's performance reports and take action as deemed necessary.
- Whenever necessary, the authorities are to provide assistance in understanding and meeting the specified requirements.
- Ensure and timeously recommend suitable corrective measures are undertaken by the Applicant/ER where the applicant has reported non-compliance or when an audit report is received indicating any non-compliance
- Enforcing compliance by the Applicant

5.2 Applicant

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts, both in the construction and operational phases. The Applicant therefore has overall and total environmental responsibility to ensure that the EMPr is implemented and that both the EMPr and the EA are complied with at all times. The Applicant is also responsible for ensuring that all other environmental and water related legislation is complied with.

The Applicant is responsible for the development and implementation of the conditions of the Environmental Authorisation in terms of the planning and design of the development and construction thereof.

The Applicant remains fully responsible for the implementation of this EMPr, and compliance with the EMPr and EA until such time as an application for amendment indicating a change in ownership or transfer of the EA to another party is submitted to DEA. Only once this amendment application has been approved is this responsibility then shifted to the new holder of the EA.

Amongst the general responsibilities above the applicant is also completely and solely responsible for:

Ensuring that any changes to the project or aspects thereof, as approved during the EIA process by the issuance of an EA, are timeously communicated to DESTEA as these may require amendments to the EA via an amendment application process.

- Appointing an ECO, and where required an environmental auditor
- It is the Applicants responsibility to notify DESTEA within 24 hours of an occurrence of any non-compliance with the EA, EMPr or any other environmental and water related legislation.
- Take the necessary action in terms of non-compliances.
- Ensuring that all of the applicants, staff, representatives, contractors, consultants and any other agent operating under the employ of the applicant comply with the EA, EMPr and any other environmental and water related legislation.
- Ensuring that all the necessary authorisations and permits have been obtained.
- Considering the ECO's observations and recommendations, taking action where required.

5.3 Applicants Representative

The Employer's Representative (ER) would act as the Applicant's (Employer's) on-site implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the environmental authorisation.

Any on-site decisions/inputs regarding environmental management are ultimately the responsibility of the ER.

The on-site ER will have the following responsibilities in terms of the implementation of the Construction phase of this EMPr and assisting the applicant to ensure compliance with the EA, EMPr and any other environmental and water related legislation:

Ensuring, in conjunction with the applicant, that the authorisations and permits have been obtained and conditions have been met.

- Ensure where required by the EA that a notice of commencement is submitted to DEA at least two (2) weeks prior to commencement.
- Assist the Applicant with the appointing of an ECO and, where specifically required by the EA an Environmental Auditor.

- The ER will ensure that the appointed ECO is paid timeously thereby ensuring an ongoing ECO service.
- Should the Applicant or the ER change ECO's, should the applicant or ER cancel the ECO's services (either verbally, in writing or implied due to non-payment of fees) or should the ECO terminate their services the ER must notify DEA of this in writing within 14 days.
- Take action in regards to any non-compliance that is reported on or noted.
- Ensuring that the Applicant is aware of any environmental non-compliance on site.
- Considering the ECO's observations and recommendations.
- Ensuring that ECO is made aware of any changes in terms of the project.
- Reviewing and approving the Contractor's method statements.
- Ensuring that all Contractor's and Sub-contractors are implementing the EMPr and meeting the necessary requirements of the EA.
- Ensuring that all works are occurring within the permitted areas.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Ordering the removal of person(s) and/or equipment not complying with the EMPr specifications.
- Ensure that the ECO is provided with any documentation required from the project team or contractors.
- Issuing fines for transgressions of site rules and penalties for contravention of the EMPr, with input from the ECO and providing proof in this regard.

5.4 Environmental Control Officer

The Environmental Control Officer (ECO) will be an independent environmental consultant appointed by the Applicant. The role of the ECO is to assist with the monitoring and where possible to provide guidance in terms of environmental matters.

The ECO will regularly monitor and review the on-site environmental management and implementation of the construction phase of this EMPr.

The ECO is not responsible for ensuring or enforcing compliance with the EA, EMPr or any other environmental and water related legislation. This is the responsibility of the applicant and authorities. The role of the ECO is that of a monitoring and supportive function and advising the Applicant of non-compliance with respect to the conditions of the EA.

The ECO's duties consist of the following:

Where required, provide assistance in terms of the Notice of commencement to DEA.

- Conducting monthly site inspections.
- Monitoring and verifying as far as possible adherence to the EMPr and the environmental authorisation.
- Monitoring and verifying that environmental mitigation measures are in place where necessary to facilitate keeping environmental impacts to a minimum.

- Reporting to the applicant and the applicant's representative any relevant observations made during site inspections.
- The ECO will report all noted/observed non-compliances with the EMPr and EA to the applicant's representative.
- As far as possible advise the applicants representative in regards to environmental matters that may become an issue.
- Reviewing the Contractor's construction method statements together with the ER.
- The ECO will make recommendations to the ER, with regards to the issuing of penalties in accordance with the EMPr.
- Facilitating the maintaining of open and direct lines of communication between the ER, Employer, Contractor and where necessary, the public, with regard to environmental matters.
- Assisting with the appointing of the relevant specialists (botanists, wetland specialists, etc.), as required, to advise the Engineer, Applicant or ER.
- Assist the contractor with basic awareness training of all construction staff, as to the requirements for working on the site.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all personnel and subcontractors coming onto site and assisting with this where necessary.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ER).
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMPr to the ER for action.
- Reporting to the applicant on the implementation of the EMPr and compliance with the environmental authorisation on a regular basis.
- Where necessary, recommending additions and/or changes to the EMPr to the directorate.
- The ECO will draft an environmental performance report on a monthly basis (except during shutdown periods). This report will be submitted to the Contractor, ER and to the DEA. The ECO may submit this via email.

5.5 The Contractor

The contractor is bound by the requirements of this EMPr. The Contractor will be subject to the issuance of penalties by the ER as stipulated herein. Any damage to the environment temporary or otherwise as a result of non-compliance with this EMPr will be made good at the contractors cost. In addition, the Contractor will have the following responsibilities:

- The Contractor will ensure that all senior and management staff involved with the project are aware and familiar with the requirements of this EMPr.
- The ECO will assist with the environmental induction training of site staff. It is the contractor's responsibility however to ensure that all staff and sub-contractors attended and undergo the necessary environmental site inductions. The Contractor will maintain a register of all staff and sub-contractors that have undergone an environmental site induction.

- The contractor will adhere to and comply with all of the requirements and specifications of this EMPr. Any noncompliance will be reported to the ECO and ER immediately.
- The contractor is fully responsible for all sub-contractors and service providers and their compliance with this EMPr on site. The Contractor will ensure that all sub-contractors and services providers are made aware of the requirements of the EMPr and that they have a responsibility to comply with the EMPr.
- The Contractor is responsible for ensuring that all sub-contractors and service providers comply with this EMPr.
- The Contractor will read the ECO performance reports and take action as required.

5.6 Environmental Auditor

Where required by the EA an environmental auditor will be appointed by the applicant. The auditor will be an independent environmental consultant. The auditor will carry out a compliance audit based on the EA and EMPr of all of the activities being undertaken. The auditor will conduct and report audit findings based on the audit requirements stipulated in the EA. Any audit costs are for the Applicants account and are in addition to regular ECO services.

6. LIASON, CO-ORDINATING AND REPORTING

The structure for all communication, correspondence and reporting between project stakeholders will be defined at the beginning of the Project with the Contractors. The EMP will be an item on the daily site meeting agenda, which will be attended by the HS Representatives, including the Environmental Coordinator. If, at any time, the Owner's Representative (Field Superintendent) is uncertain in any respect of the implementation of any aspect of the EMP, he shall consult with the Environmental Co-ordinator. The ESO and Environmental Co-ordinator shall report directly to the Owner's Representative (Field Superintendent). All reports concerning non-compliance by any of the sub-contractors shall be routed through the Owner's Representative (Field Superintendent) and shall be discussed at the monthly site meetings. The SHEQ Manager shall be informed of the environmental issues relating to the rectification of non-compliance and any other relevant environmental management aspect.

6.1 Reporting

In addition to all reporting requirements identified in the EMP, records shall be kept by the Environmental Co-ordinator of all monitoring results, monitoring reports, incident records, audit reports and management reviews. Minutes of all environmental project meetings shall be submitted to the Environmental Co-ordinator. All report requirements shall be agreed at the beginning of the Project with sub-Contractors but in general shall be as follows: the sub-contractor site supervisor(s) shall report environmental matters to the ESO, who shall report to the clients Environmental Co-ordinator and the Field Superintendent. The clients Environmental Co-ordinator shall ensure reporting to the Project Manager, and SHE Manager, as well as clear communication about activities to the Field Superintendent.

7. METHOD STATEMENTS

Method statements are written submissions by the Contractor to the ER (with input from the ECO) in response to the requirements of this EMPr or to a request by the ER or ECO. A minimum requirement will consist of the listed MS's below. Further MS's may be requested by the ER or ECO.

The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects as specified. Annexure 2 provides an example for a method statement template. It is the Contractors responsibility to ensure that the required method statements are drafted and submitted.

The Contractor shall not commence the activity for which a method statement is required until the ER has approved the relevant method statement.

Method statements must be submitted at least seven (7) business days prior to the date on which approval is required (start of the activity). Should the method statement be rejected this will be done so with comment. The seven-day submission period will commence once again on re-submission of the MS. Should the MS be submitted and no response (acceptance or rejection) be obtained within 7 days from the ER or ECO the MS will be considered as having been accepted and work can commence in line with the submitted MS.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost and to the satisfaction the ECO and ER.

The method statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site.
- Start date and duration of the procedure.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
- Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
- Mitigation measure that will be employed.
- Compliance / non-compliance with the EMPr Specification and motivation if non-compliant

8. ENVIRONMENTAL AWARENESS PLAN

8.1 Environmental Awareness and Risk Training

All staff members involved in work on site are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMPr, prior to work commencing. The briefing will usually take the form of an on-site talk and demonstration by the ECO. The education / awareness programme should be aimed at all levels of management within the contractor team. See "basic rules of conduct" below.

8.2 Basic Rules of Conduct

The following list represents the basic *Do's* and *Don'ts* towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid. **NOTE: ALL new site personnel must** attend an environmental awareness/induction presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ECO.

DO:

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind.
- Report all fuel or oil spills immediately and stop the spill from continuing.
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence).
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand.
- Prevent excessive noise.

DO NOT:

- Do not litter - report dirty or full facilities, i.e. full dustbins and dirty or blocked toilets.
- Do not make any fires.
- Do not enter any fenced off or demarcated areas.
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses.
- Do not litter or leave food lying around.

9. MONITORING AND COMPLIANCE

A suitably-qualified Environmental Control Officer (ECO) should be appointed by the Applicant / Developer to oversee the implementation of the operational and decommissioning phase mitigation measures described in this EMPr, as well as the conditions of authorisation as described in the Environmental Authorisation.

The ECO should have at least 5 years' experience as an ECO, or be supported by a qualified ECO. He/she may not be someone appointed by the contractor, engineer or other party involved with this project, other than the Applicant / Developer.

The following applies, amongst others, to the ECO's role:

- The ECO should undertake **ad hoc inspection during the planting seasons (operational phase) and ad hoc inspections during decommissioning of the project,**
- The ECO must **report to** the Applicant / Developer only.
- The ECO should present an **environmental site induction** / **awareness training session** to all personnel before work on site commences, as are also described below; and
- After completion of the construction activities, an environmental audit should be undertaken by the ECO, before commencement of the operational phase, in order to determine compliance with the EMPr and the Environmental Authorisation. The audit report should be submitted to the competent authority.

The ECO can recommend the stopping of works if in his/her opinion there is a serious threat to, or impact on the environment, caused directly from the construction and / or operational phase. This authority is to be limited to emergency situations where consultation with the engineer or applicant is not immediately available and proof of that made available. In all such work stoppage situations the ECO is to inform the engineer and applicant of the reasons for the stoppage as soon as possible.

Upon failure by the contractor or his employee(s) to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the engineer to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

9.1 ECO Site Inspection Reports

The ECO site inspection reports (also called "ECO checklists") will report on the compliance of the construction and operational phase mitigation measures contained in the EMPr, as well as the conditions of approval described in the Environmental Authorisation. The report should be submitted to the applicant, within five (5) days of the ECO site inspection. Copies of the inspection reports should be kept on site.

The contractor's meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes form part of the official environmental record.

9.2 Photographs

Photographs of all environmental transgression during the construction and operational phase must be included in ECO reports. These photographs should be stored with other records related to this EMPr. If captured in digital format, hard copies, in colour, must be kept with all other records relevant to the implementation of this EMPr.

10. IMPACTS AND MITIGATION MEASURES

A number of potential environmental impacts that may arise during the project have been identified. These are outlined in the following table below, and guidelines and mitigation measures are provided.

The Contractor must familiarise himself with the requirements of the EMPr, keeping in mind that other site-specific requirements as outlined in the Environmental Authorisation must also be complied with.

Table 4: Construction Phase EMP

CONSTRUCTION PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
As this is an application and EMPr for a Section 24G rectification application whereby the pivot areas and the two water pipelines already exist, no construction phase is available for this project.						

Table 5: Operational Phase EMP

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
1	Legislative compliance	Non-compliance with South African environmental legislation.	**Objective:** Ensure compliance with all triggered environmental legislation. **Target:** Commence operational processes with all authorisations, permits and approvals received and available on site.	a. The Developer is to have the following permits on site: • Environmental Authorisation • Ploughing certificate • Environmental Management Program (EMPr • Water Use Authorisation	Obtain copies of all required documents and ensure they are filed and readily available on site; Adequate record keeping	**Responsibility:** Applicant **Monitoring Frequency:** Once off Keep on site
2	Traffic.	Impact on traffic.	**Objective:** Minimise the disruption of road users. **Target:**	a. All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits; b. Abnormal loads should not be transported after dark;	Incident Register; Photographs; ECO Audit Checklist	**Responsibility:** Applicant **Monitoring Frequency:** Monthly

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
			Minimal disruption of road users.	c. Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; and, d. Transport of materials should be limited to the least amount of trips possible. Accommodation and disbursements		
3	Erosion Control.	Erosion of soil on site.	**Objective:** Prevent soil erosion. **Target:** No signs of soil erosion are evident on site.	a. Ensure correct drainage of areas; b. The layout of the area should be optimised to limit the erosion potential; c. Rehabilitate denuded areas especially slopes with appropriate plant species. Erosion protection measures such as geotextile, rocks and topsoil mixtures as specified should be used.	Incident Register; Photographs; ECO Audit Checklist	**Responsibility:** Applicant **Monitoring Frequency:** Monthly
4	Solid Waste Handling during harvesting times	Pollution and site contamination by solid waste	**Objective:** Minimise the generation of solid waste. Dispose of solid waste in the appropriate manner to a landfill site. **Target:**	a. Adequate waste containers to be provided on site during harvesting time. b. Keep the footprint area litter free and tidy. c. All domestic waste is to be removed from site as and when required and disposed of at a registered solid waste landfill site. d. Care should be taken to ensure that no waste is lost off disposal vehicles on route to the landfill. If needed, a tarpaulin can be utilised.	Applicant project manager to manage waste management and removal during harvesting times.	**Responsibility:** Applicant / Project manager **Monitoring Frequency:** During harvesting times

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
			No record of pollution or site contamination by solid waste.	e. Do not dump waste of any nature, or any foreign material in any drainage lines. f. The burning or burial of solid waste on site is prohibited.		
5	Water Conservation	Wasting water as a result of negligence or inadequate usage planning and management of irrigation (overuse)	**Objective:** Promote and implement water use efficiency mechanisms through adequate planning and management of irrigation. **Target:** No unnecessary water wastage. Keep irrigation and water use within the allocated water volumes and as required for the operational processes. Reduce usage as far as possible.	a. Implement adequate irrigation and water usage planning and management measures in accordance with site requirement and allocated water volumes in order to avoid unnecessary water usage (wastage). b. Prevent leakages in the irrigation system by means of frequent maintenance.	Applicant project manager to continually monitor water usage	**Responsibility:** Applicant / Project manager **Monitoring Frequency:** Continual
6	Sewage waste during harvesting times	Pollution and site contamination by sewage.	**Objective:** Provide facilities for appropriate management	a. Sufficient portable chemical toilets will be supplied on site for the manual labourers during the harvesting times. These toilets will be cleaned and waste removed by an	Applicant project manager to manage sewage	**Responsibility:** Applicant / Project manager

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
			collection and disposal of sewage during harvesting times. Sewage containment sizes and removal frequencies should be appropriate in order to prevent any potential chances of overflow and environmental contamination. **Target:** No record of pollution or site contamination by sewage.	appropriate contractor on a regular basis as and when required. b. Do not locate a site toilet within the 1:100 year floodline, or within a distance of 100 m of any drainage lines; c. Toilets are to be maintained and cleaned regularly to ensure functionality and an adequate level of hygiene. This will assist with disease prevention. d. Removal of sewage from sight should be conducted on an adequate and frequent basis by an accredited contractor. e. Only toilet paper is to be flushed down the chemical toilets. Personnel are to be informed on sanitary implementation as part of the environmental awareness.	management and removal during harvesting times.	**Monitoring Frequency:** During harvesting times
7	Noise Generation.	Noise nuisance from site operations.	**Objective:** To avoid excessive noise generation from site operations. **Target:** Minimise the incidence of noise generation.	a. Machinery should be in sound mechanical condition and equipped with the necessary silencers; and b. Workers on site should adhere to the prescribed working hours (7am – 6pm).	Applicant to adhere to business hours.	**Responsibility:** Applicant **Monitoring Frequency:** Monthly
8	Fire Prevention.	Uncontrollable fire.	**Objective:** Prevent the outbreak of fires emanating	a. Ensure the work site is equipped with adequate firefighting equipment according to SANS 10087;	Applicant to comply with firefighting regulations.	**Responsibility:** Applicant

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
			from operational activities. **Target:** No incidences of fires are recorded for the site.	b. All equipment must have at least one firefighting extinguisher; c. Workers must be adequately trained in the handling of firefighting equipment as well as in fire drills; d. No open fires are permitted anywhere on site due to the handling of petroleum on site; e. A designated smoking area must be identified where it does not pose a risk for starting a fire; and f. All health and safety signage must be in place to warn the public.		**Monitoring Frequency:** Monthly
9	Soil and water contamination due to operational activities such as the use of hazardous materials on site.	Pollution of soil and water contamination by hazardous waste.	**Objective:** Provide facilities for appropriate collection and disposal of hazardous waste. **Target:** No record of pollution or site contamination by hazardous waste.	a. Material Safety Data Sheets (MSDSs) should 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 leakage; b. All spillage must be cleaned up immediately after they have occurred; c. Spillage 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; d. Vehicles and machinery must be regularly serviced to avoid leakages;	Incident Register; Photographs; ECO Audit Checklist	**Responsibility:** Applicant **Monitoring Frequency:** Monthly

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
				e. No uncontrolled discharges from the site or working area to depressions may be permitted. f. The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited; g. Fuel and chemical storage should be done within a designated area only, which is properly bund and able to contain 110% of the capacity of fuel or chemicals stored within; h. Construction vehicles must be inspected every morning before work commence to ensure that no leakages do occur; i. All personnel must receive induction on how to report spillages, contain them and treat them accordingly; j. Spill kits must be available at each working station; k. Drip trays must be placed beneath all construction equipment that is stationary on site or within the site camp; and, l. Hazardous waste must be stored in bins with a lid in a demarcated waste area, and must be disposed of at a hazardous treatment facility with records on file.		
10	Health and Safety.	Dangerous working conditions for workers.	**Objective:** To prevent any casualties on site.	a. Ensure that PPE is available to Personnel;	Incident Register; Photographs;	**Responsibility:** Applicant

OPERATIONAL PHASE						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
			Target: No Personnel casualties on site.	b. Adhere to the Occupational Health and Safety Act; c. Keep the first aid kit stocked; d. Issue all workers with necessary health and safety items; e. Potentially hazardous areas must be demarcated with danger tape; f. Appropriate signage must be placed to caution Employees and contractors not to enter certain structures without authorisation; g. Regular safety inspections must be conducted to ensure that participants are equipped with necessary safety equipment; and, h. All construction personnel to wear hard hats and reflector jackets at all times.	ECO Audit Checklist	**Monitoring Frequency:** Monthly
11	Local communities during harvesting times	Local job creation	**Objective:** Create new jobs and provide a manner of income to local communities. **Target:** Implement the principle of local employment as far as possible.	a. Implement the principle of local employment as far as possible in order to provide job opportunities and a manner of income to the local communities.	Applicant project manager to ensure implementation of local employment principle.	**Responsibility:** Applicant **Monitoring Frequency:** During harvesting times

Table 6: Decommissioning Phase EMP

DECOMMISSIONING PHASE EMP						
No.	**Aspect**	**Associated Impacts**	**Objective & Target**	**Management Action**	**Monitoring Action**	**Responsible Party & Monitoring Frequency**
It is not foreseen that this project will be decommissioned as this is an existing profitable agricultural project. If in the future the applicant wishes to decommission the pivots and water pipelines, a new/separate Environmental Impact Assessment in line with the NEMA listed activities has to be undertaken, with an Environmental Management Plan, for the decommissioning phase of the project.						

11. EMERGENCY RESPONSE PLAN

The following table is provided to assist the ECO and Site Manager contractor with remedial work options and problem solving:

Observation or Event	Action by Inspector or Observer	Action by Site Manager
Spillage of diesel or hydrocarbons on soil	Report to Site Manager and continue observations. Also check: ➢ That the source causing the spillage has ceased, and that the affected area is isolated to prevent spreading of the hazardous substance, where after it should be rehabilitated.	Action will be required ASAP by following the next steps: ➢ Dig down into the soil to see how far down the pollution penetrated, ➢ If less than 300mm penetrated: a. Turn the soil over to expose it to the air. b. Apply Mono Ammonium Phosphate (MAP) at a rate of 58gr/m² to the overturned soil. c. Water enough to keep the soil moist. ➢ If penetration is greater than 300mm: a. Remove the affected soil and spread in a layer not more than 300mm thick. b. Apply MAP at a rate of 50gr/m². c. Water enough to keep the soil moist. ➢ Repeat the above steps every 6 weeks or until the soil is clean.
Erosion	Report to Site Manager and continue observations. Also check: ➢ That all vehicular movement is restricted to existing access routes to prevent crisscrossing of tracks through undisturbed areas.	Action will be required ASAP: ➢ Implement erosion protection works at identified problem areas. ➢ Implement remedial works at affected areas in order to restore the area to its previous or better status.

12. INCIDENT REGISTER

INCIDENT REGISTER: SPITSKOP RESIDENTIAL DEVELOPMENT					
NAME OF PERSON REPORTING THE INCIDENT	**INCIDENT**	**DATE OF INCIDENT IDENTIFIED**	**HOW WAS INCIDENT ADDRESSED?**	**DATE OF RECTIFICATION**	**SIGNATURE**

13. REHABILITATION MEASURES AND CLOSURE PLAN

The rehabilitation phase follows completion of the operational phase and entails site clean-up and site rehabilitation. The underlying aim of rehabilitation is the process of returning land within the site boundary to some degree of its former natural state.

Key aspects within this process include the:

- Removal of structures and infrastructure;

- Handling of inert waste and rubble;

- Handling of hazardous waste and pollution control;

- Final shaping of the terrain;

- Topsoil replacement and soil amelioration;

- Ripping and scarifying of surfaces;

- Planting of indigenous occurring vegetation (if deemed necessary); and

- Maintenance.

12.1 Rehabilitation Measures

Removal of structures and infrastructure
• On completion of a section of works, the area must be rehabilitated by suitable landscaping, levelling, topsoil dressing, land preparation, alien plant eradication and where ascribed for by the ECO, vegetation establishment; • Clear and completely remove from site all operational structures and temporary infrastructure; • All permanent infrastructures must be returned to a useable state. • Once construction is completed and these areas are vacated, they must be rehabilitated to a standard as set by the ECO.
Topsoil replacement and soil amelioration

- The reinstatement of disturbed areas must follow immediately after the removal of structures and temporary infrastructure;
- Topsoil backfilling must be undertaken when the soil is dry, and not following any recent rainfall events;
- All stockpiled topsoil together with herbaceous vegetation should be replaced and redistributed over a disturbed area such as temporary access roads;
- Topsoil must be returned to the same site from where it was stripped;
- When insufficient topsoil remains, soil of a similar quality can be obtained from a nearby area within the site area which was disturbed;
- Once topsoil has been returned to the ground, stripped vegetation should be randomly spread by hand over the area.

Inert waste

- Domestic waste must be completely removed from the site and disposed of at a landfill site.

Maintenance

- All re-growth of invasive vegetative material will be monitored by the Developer for one year;
- All areas under rehabilitation are to be treated as no-go areas using danger tape and steel droppers/fencing and cordoned off, to prevent vehicular, pedestrian and livestock access.
- Any re-vegetation must be done using plant species in occurrence on site;
- Control invasive plant species and weeds using approved methods of manual or chemical intervention;
- The reestablishment of vegetation should be allowed several rainy seasons, given the arid nature of the climate and region.

14. PREVENT TRIGGERING OF FURTHER LISTED ACTIVITIES

It is of utmost importance to adhere to the following guidelines in order to prevent the triggering of activities that may need to be authorised:

PLEASE DO NOT	TO PREVENT TRIGGERING
ARCHAEOLOGY	
Avoid archaeological, historical sites or any exhumed artefacts discovered through excavations.	Archaeological survey / SAHRA permit

15. REFERENCES

Mucina, L. & Rutherford, M.C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

National Environmental Management Act (Act 107 of 1998)