226MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces

FINAL BASIC ASSESSMENT REPORT

APPENDIX G:

Environmental Management Programme (EMPr)

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Date:	25 January 2021
Document Title:	Proposed Development of the 226MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces – **Environmental Management Programme (EMPr)**
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Confidentiality Statement

This document has been updated by SiVEST SA (Pty) Ltd

1 INTRODUCTION

This Environmental Management Programme (EMPr) has been prepared as part of the requirements of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 amended Environmental Impact Assessment (EIA) Regulations promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R325 on 7 April 2017. This EMPr is being submitted to the National Department of Environmental Affairs (DEA) as part of the Application for a Part 2 EA Amendment to the Environmental Authorisation (EA) that was issued on 25 March 2019 (DEA Reference Number 14/12/16/3/3/1/1976).

The proposed Kudusberg WEF will be developed on the following land portions:

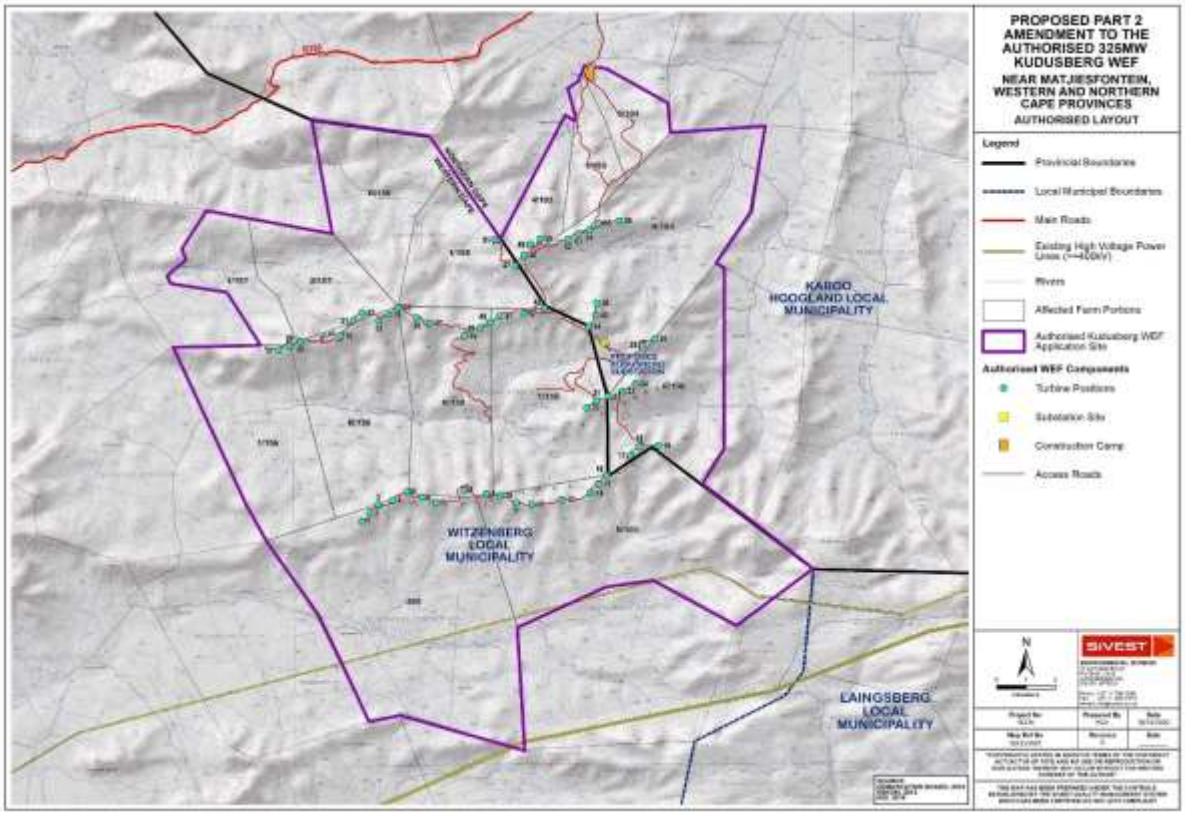


Figure 1: Project locality map for the authorised Kudusberg WEF (14/12/16/3/3/1/1976/AM1)

Kudusberg Wind Farm is now proposing to submit a Part 2 EA Amendment Application to split the authorised Kudusberg WEF (14/12/16/3/3/1/1976/AM1) into two (2) separate smaller WEF projects, namely the Kudusberg WEF and Oya WEF, which will result in a number of technical and administrative changes detailed in Table 2. The split is being proposed to allow the projects to be suitable for numerous opportunities such as either the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP), other government run procurement programmes that may arise or for sale to private entities, if enabled and/or required in the drive for energy security in South Africa.

Following the split, the southern section of the authorised WEF will remain known as the Kudusberg WEF (authorised under 14/12/16/3/3/1/1976/AM1) (Figure 2). The layout for the proposed Kudusberg WEF (southern section of the authorised WEF) is presented in Figure 2 below.

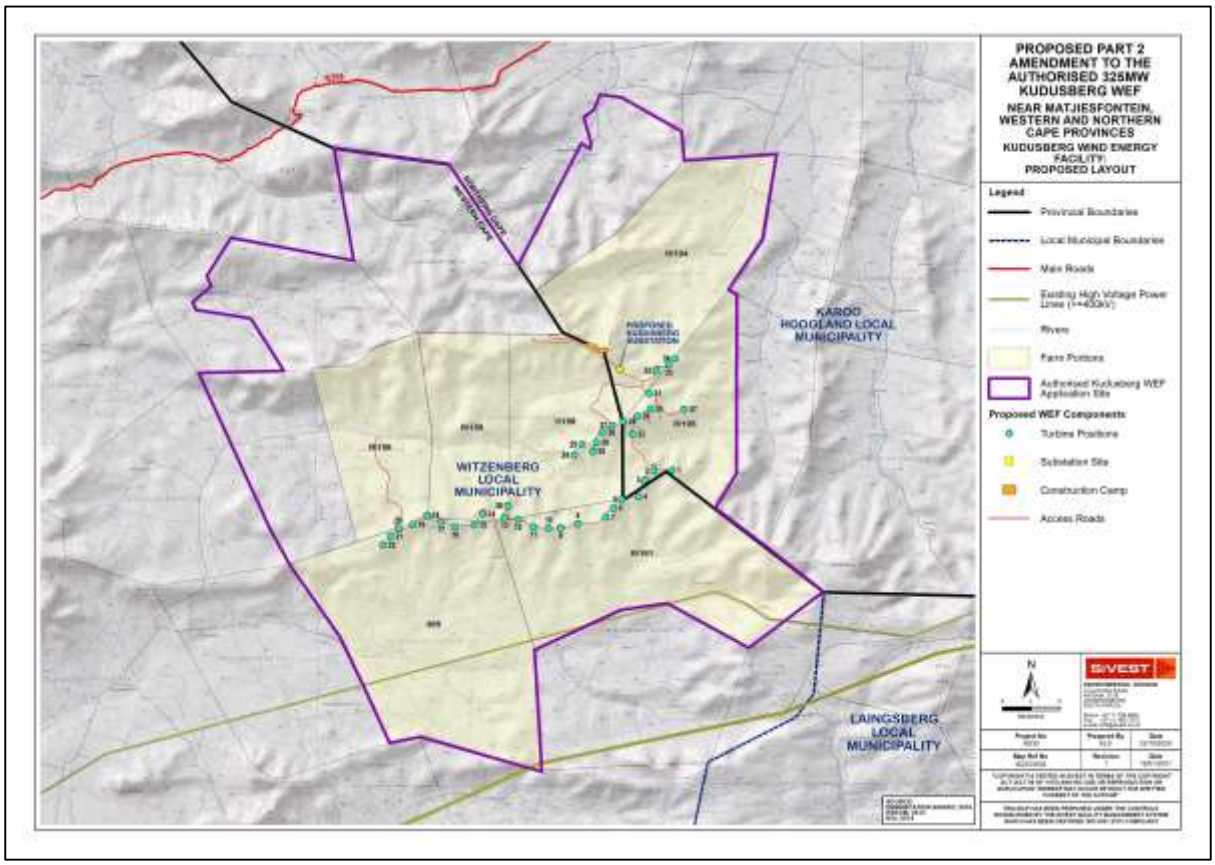


Figure 2: Project locality map for the proposed Kudusberg WEF (southern section of the authorised WEF)

The approved EMPr (this document) authorised as part of the Kudusberg EA is being amended to fit the new Kudusberg layout following the part 2 amendment. This is the Draft EMPr and a final EMPr will be submitted for approval prior to construction commencing.

This EMPr will be made available to Interested and Affected Parties (I&APs), stakeholders and Organs of State, as part of the Draft BA Report, for a 30-day review period. Comments received from stakeholders during this aforementioned review period will be incorporated into the EMPr, where applicable. Following the incorporation of comments from I&APs, stakeholders and Organs of State, this EMPr is intended as a "living" document and should continue to be updated regularly, as needed.

It is important to note that this EMPr is a draft version and will be updated before construction commences. A final EMPr, along with a Final layout, will be submitted to the DEFF for decision-making / approval.

The proposed Kudusberg WEF (following the amendment) will be developed on the following land portions (Table 1):

Table 1: The land portions that will be affected by the proposed Kudusberg WEF and associated road infrastructure

Number	Farm name and number	21-Digit Surveyor General (SG) Code
Western Cape:		
1	Portion 1 of the Farm Gats Rivier No 156	C01900000000015600001
2	Remainder of the Farm Gats Rivier No 156	C01900000000015600000
3	Portion 1 of the Farm Oliviers Berg No 159	C01900000000015900001

Number	Farm name and number	21-Digit Surveyor General (SG) Code
4	Remainder of the Farm Oliviers Berg No 159	C01900000000015900000
5	Klipbanks Fontein No 395	C01900000000039500000
6	Remainder of the Farm Muishond Rivier No 159	C01900000000016100000
Northern Cape:		
7	Remainder of 196 Karree Kloof Farm	C07200000000019600000
8	Remainder of 194 Matjes Fontein Farm	C07200000000019400000
Properties affected by public access road:		
9	169 Zeekoegat Farm	C07200000000016900000
10	Portion 1 of 170 Roodeheuvel Farm	C07200000000017000001
11	Remainder of 170 Roodeheuvel Farm	C07200000000017000000
12	Remainder of 190 Wind Heuvel Farm	C07200000000019000000
13	Portion 1 of 190 Wind Heuvel Farm	C07200000000019000001
14	Portion 5 of 193 Urias Gat Farm	C07200000000019300005
15	Remainder of 171 Vinke Kuil Farm	C07200000000017100000
16	Alkant Re/220 Farm	C07200000000022000000
17	Portion 1 of 174 Lange Huis Farm	C07200000000017400001

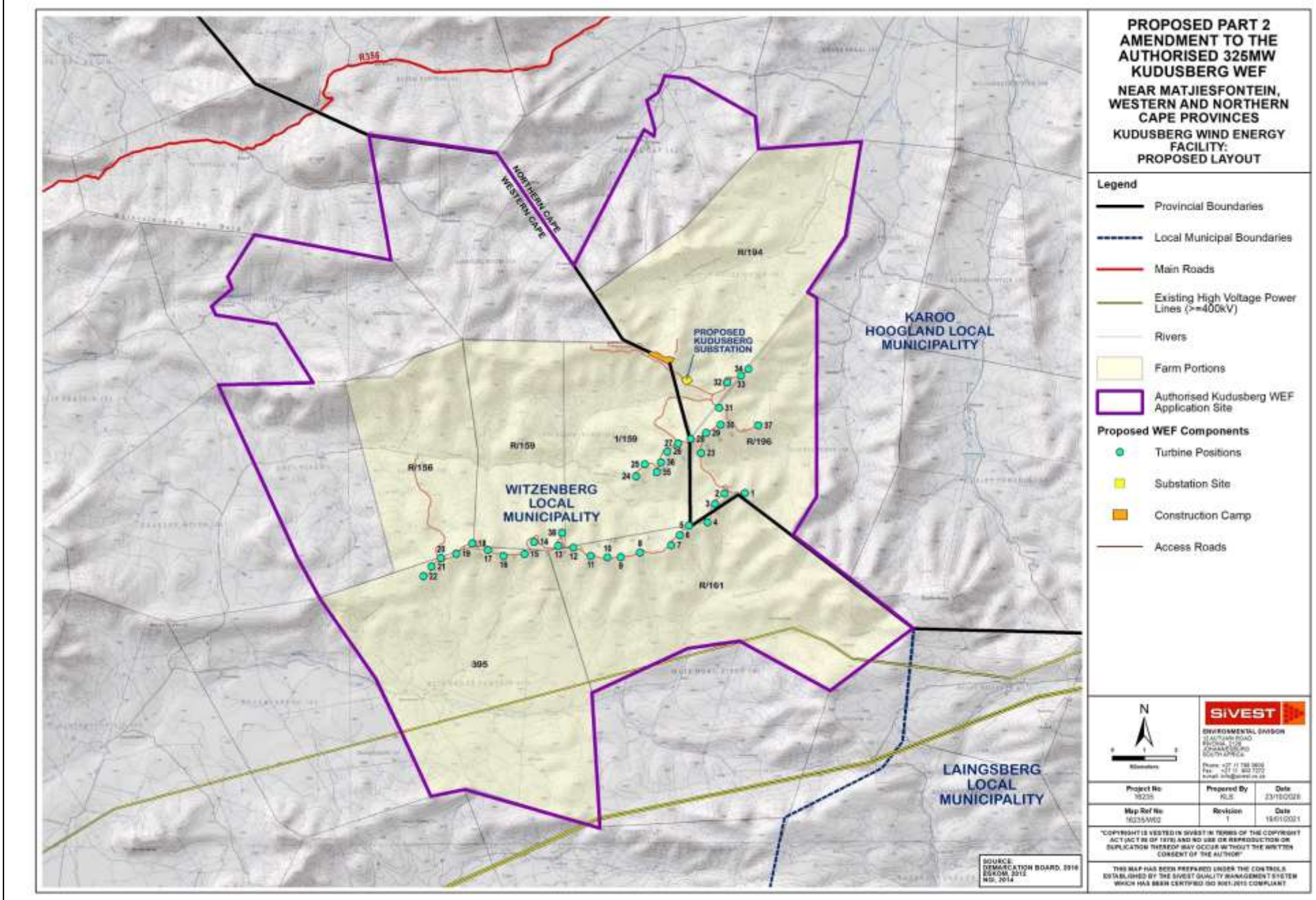


Figure 3: Project locality map for the proposed Kudusberg WEF

1.1 PROJECT OVERVIEW

Kudusberg Wind Farm was issued with an EA for the proposed construction of the 325MW Kudusberg WEF and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces. The EA was granted on 25 March 2019 (14/12/16/3/3/1/1976), and subsequently amended on 04 April 2019 to correct a minor naming error (14/12/16/3/3/1/1976/AM1). The layout for the authorised Kudusberg WEF is presented in Figure 1.

Kudusberg Wind Farm is now proposing to submit a Part 2 EA Amendment Application to split the authorised Kudusberg WEF (14/12/16/3/3/1/1976/AM1) into two (2) separate smaller WEF projects, namely the Kudusberg WEF and Oya WEF, which will result in a number of technical and administrative changes detailed below in Table 2 below. The split is being proposed to allow the projects to be suitable for numerous opportunities such as either the REIPPPP, RMIPPPP, other government run procurement programmes that may arise or for sale to private entities, if enabled and/or required in the drive for energy security in South Africa.

Following the split, the southern section of the authorised WEF will remain known as the Kudusberg WEF (authorised under 14/12/16/3/3/1/1976/AM1) (Table 2, Figure 2). The layout for the proposed Kudusberg WEF (southern section of the authorised WEF) is presented in Figure 2 above.

Furthermore, the approved EMPr authorised as part of the Kudusberg EA is being amended to each WEF. This is however a Draft EMPr. A final EMPr will be submitted for approval prior to construction commencing.

The proposed WEF is located approximately 45km south-west of the town of Sutherland within the Witzenberg and Karoo Hoogland Local Municipalities, which fall within the Cape Winelands and Namakwa District Municipalities of the Western and Northern Cape Provinces respectively. It should also be noted that the authorised Kudusberg WEF falls entirely within the Renewable Energy Zone (REDZ) 2 (i.e. Komsberg REDZ), which was Gazetted in February 2018 by the Minister of Environmental Affairs (GN 114), and therefore the proposed Kudusberg WEF (following amendment) will also fall entirely within the above-mentioned REDZ.

The proposed amendments in themselves are not listed activities according to Government Notice (GN) R326, R327, R325 and R324 of the Environmental Impact Assessment (EIA) Regulations (as amended on 07 April 2017 and 13 July 2018), and do not trigger any new listed activity. In addition, the proposed amendments are within the original authorised development footprint, and do not change the scope of the EA.

The amendments detailed in Table 2 below are proposed for the proposed Kudusberg WEF (southern section of the authorised WEF) mentioned above. It should be noted that this EMPr has been compiled for the proposed smaller Kudusberg WEF (southern section of authorised Kudusberg WEF) specifically.

Table 2: Proposed Amendments

Aspect to be amended	Authorised	Proposed Amendment Kudusberg WEF
Administrative Aspects		
Amend the holder of the EA's	Kudusberg Wind Farm (Pty) Ltd	Kudusberg Wind Farm (Pty) Ltd
Amend the name of the WEFs	Kudusberg Wind Energy Facility	Kudusberg Wind Energy Facility
Contact Details	kudusberg@g7energies.com	kudusberg@g7energies.com
Extend the validity of the EA	This activity must commence within a period of five (05) years from the date of issue of this environmental authorisation	This activity must commence within a period of five (05) years from the date of issue of this amended environmental authorisation
Location of Activity and SG codes	**Western Cape** 1. Portion 1 of 156 Gats Rivier Farm: C01900000000015600001 2. Portion 3 of 156 Gats River Farm: C01900000000015600002 3. Remainder of 156 Gats Rivier Farm: C01900000000015600000 4. Portion 1 of 157 Riet Fontein Farm: C01900000000015700001 5. Portion 1 of 158 Amandelbloom Farm: C01900000000015800001 6. Remainder of 158 Amandelboom Farm: C01900000000015800000 7. Portion 1 of 159 Oliviers Berg Farm: C01900000000015900001 8. Remainder of 159 Oliviers Berg Farm: C01900000000015900000 9. Portion 2 of 157 Riet Fontein Farm: C01900000000015700002 10. Remainder of 161 Muishond Rivier Farm: C01900000000016100000 11. Remainder of 395 Klipbanks Fontein Farm: C01900000000019500000 **Northern Cape** 12. Portion 4 of 193 Urias Gat Farm: C07200000000019300004 13. Portion 6 of 193 Urias Gat Farm: C07200000000019300006 14. Remainder of 193 Urias Gat Farm: C07200000000019300000 15. Remainder of 194 Matjes Fontein Farm: C07200000000019400000 16. Remainder of 196 Karree Kloof Farm: C07200000000019600000 **Properties affected by public road:** 17. 169 Zeekoegat Farm: C07200000000016900000 18. Portion 1 of 170 Roodeheuvel Farm: C07200000000017000001 19. Remainder of 170 Roodeheuvel Farm: C07200000000017000000 20. Remainder of 190 Wind Heuvel Farm: C07200000000019000000 21. Portion 1 of 190 Wind Heuvel Farm: C07200000000019000001 22. Portion 5 of 193 Urias Gat Farm: C07200000000019300005 23. Remainder of 171 Vinke Kuil Farm: C07200000000017100000	**Western Cape** 1. Portion 1 of the Farm Gats Rivier No 156: C01900000000015600001 2. Remainder of the Farm Gats Rivier No 156: C01900000000015600000 3. Portion 1 of the Farm Oliviers Berg No 159; C01900000000015900001 4. Remainder of the Farm Oliviers Berg No 159: C01900000000015900000 5. Klipbanks Fontein No 395: C01900000000039500000 6. Remainder of the Farm Muishond Rivier No 159: C01900000000016100000 **Northern Cape** 7. Remainder of the Farm Karee Kloof No 196: C07200000000019600000 8. Remainder of the Farm Matjes Fontein No 194: C07200000000019400000 **Properties affected by public road:** 9. Zeekoegat Farm No 169: C07200000000016900000 10. Portion 1 of the Farm Roodeheuvel No 170: C07200000000017000001 11. Remainder of the Farm Roodeheuvel No 170: C07200000000017000000 12. Remainder of the Farm Wind Heuvel No 190: C07200000000019000000 13. Portion 1 of the Farm Wind Heuvel No 190: C07200000000019000001 14. Portion 5 of the Farm Urias Gat No 193: C07200000000019300005 15. Remainder of the Farm Vinke Kuil No 171: C07200000000017100000 16. The Farm Alkant No 220: C07200000000022000000 17. Portion 1 of the Farm Lange Huis No 174: C07200000000017400001

	24. Alkant Re/220 Farm: C07200000000022000000 25. Portion 1 of 174 Lange Huis Farm: C07200000000017400001	
Co-ordinates	**Centre:** 32°50' 56.0868"S; °19' 25.0608"E **North:** 32°40' 29.8812"S; 20°24' 57.78"E **East:** 32°43' 53.8212"S; 20°29' 32.28"E **South-East:** 32°54' 6.66"S; 20°23' 3.7788"E **South-West:** 32°55' 32.0412"S; 20°16' 24.8988"E **West:** 32°52' 12.7812"S; 20°14' 20.6988"E	**APPLICATION SITE:** **Coordinates at Corner Points (DD MM SS.sss)** 1. S32° 48' 14.853"; E20° 23' 15.057" 2. S32° 48' 7.939"; E20° 25' 19.086" 3. S32° 49' 44.075"; E20° 24' 59.144" 4. S32° 50' 41.159"; E20° 24' 13.445" 5. S32° 50' 46.823"; E20° 24' 24.286" 6. S32° 54' 9.411"; E20° 24' 22.544" 7. S32° 54' 48.192"; E20° 23' 53.935" 8. S32° 56' 23.562"; E20° 26' 18.389" 9. S32° 57' 26.788"; E20° 24' 38.101" 10. S32° 56' 35.721"; E20° 22' 48.877" 11. S32° 56' 42.813"; E20° 21' 46.490" 12. S32° 57' 27.491"; E20° 19' 50.038" 13. S32° 59' 45.215"; E20° 19' 58.513" 14. S32° 59' 5.070"; E20° 17' 15.888" 15. S32° 59' 11.874"; E20° 16' 34.719" 16. S32° 57' 11.539"; E20° 15' 29.007" 17. S32° 55' 48.840"; E20° 14' 21.666" 18. S32° 55' 23.944"; E20° 15' 52.693" 19. S32° 52' 9.370"; E20° 14' 54.031" 20. S32° 52' 4.579"; E20° 15' 50.647" 21. S32° 51' 44.360"; E20° 16' 19.552" 22. S32° 51' 27.665"; E20° 17' 16.598" 23. S32° 51' 31.913"; E20° 20' 32.550" 24. S32° 50' 41.238"; E20° 19' 54.404" 25. S32° 49' 35.741"; E20° 21' 44.517"

		Coordinates at Centre Point (DD MM SS.sss) 26. S32° 54' 10.102"; E20° 20' 14.737" **CONSTRUCTION CAMP:** **Coordinates at Centre Point (DD MM SS.sss)** **CENTRE:** S32° 51' 46.797"; E20° 21' 16.710" **Coordinates at Corner Points:** **CC1_01:** S32° 51' 41.254"; E20° 21' 2.209" **CC1_02:** S32° 51' 40.895"; E20° 21' 11.315" **CC1_03:** S32° 51' 46.466"; E20° 21' 19.638" **CC1_04:** S32° 51' 45.812"; E20° 21' 26.156" **CC1_05:** S32° 51' 47.063"; E20° 21' 32.475" **CC1_06:** S32° 51' 50.861"; E20° 21' 30.264" **CC1_07:** S32° 51' 51.339"; E20° 21' 26.005" **CC1_08:** S32° 51' 53.100"; E20° 21' 24.630" **CC1_09:** S32° 51' 43.651"; E20° 21' 0.749" **SUBSTATION:** **Coordinates at Corner Points (DD MM SS.sss):** **SS1_01:** S32° 52' 4.061"; E20° 21' 48.372" **SS1_02:** S32° 52' 10.456"; E20° 21' 53.934" **SS1_03:** S32° 52' 15.215"; E20° 21' 45.714" **SS1_04:** S32° 52' 9.014"; E20° 21' 40.229" **Coordinates at Centre Point (DD MM SS.sss):** **CENTRE:** S32° 52' 9.655"; E20° 21' 47.079"
Technical Aspects		
Aspect to be amended	**Authorised**	**Proposed Amendment** **Kudusberg WEF**
Overall Capacity	325 MW	226 MW
Number of turbines	56	38
Hub height	Up to 140 m	No Change i.e. up to 140 m
Rotor diameter	Up to 180 m	No Change i.e. up to 180 m
Blade length	Up to 90 m	No Change i.e. up to 90 m

Layout	-	Final layout to be submitted prior to the start of construction
Wind Measuring Lattice Masts	Up to 4 x 140 m high depending the final hub height	2 x up to 140 m high depending the final hub height
EMPr	The EMPr submitted as part of the Application for EA is hereby approved.	To be submitted based on final approval of layout

The proposed Kudusberg WEF will comprise a maximum of 226 MW. Once commercial operation date is achieved, the proposed facility will generate electricity for a minimum period of 20 years or the duration of the power purchase agreement. The properties on which the Kudusberg is to be constructed will be leased by Kudusberg Wind Farm from the property owners for the life span of the project. It is proposed that the proponent will assess the 132kV electrical infrastructure separately through a Basic Assessment (BA) Process.

The Kudusberg WEF will consist of the following components:

- ***Wind turbines:***

  - Maximum number of 38 turbines;
  - Approximate hub height of up to 140 m and rotor diameter of up to 180 m;
  - Blade length of up to 90 m;
  - Reinforced concrete foundation: 30 m x 30 m; at a depth of 5 m;
  - Crane pad (hard stand areas): 90 m x 50 m at each turbine (total footprint 25.2 ha); and
  - Turbine capacity: 3 MW – up to 6.5 MW.

- ***Collector substation:***

  - One 33/132 kV onsite substation will be constructed on site. The 33 kV footprint was assessed in this BA and the 132 kV footprint will be assessed in a separate BA process as the current applicant will remain in control of the low voltage components of the 33/132 kV substation, whereas the high voltage components of this substation will likely be ceded to Eskom shortly after the completion of construction. The total footprint of this onsite substation will be approximately 2.25 ha;
  - Electrical transformers (690 V/33 kV) adjacent to each turbine (typical footprint of 2 m x 2 m, but can be up to 10 m x 10 m at certain locations) to step up the voltage to 33 kV; and
  - Underground 33 kV cabling between turbines buried along access roads, where feasible, with overhead 33 kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132 kV substation.

- ***Operations and Maintenance building:***

  - Operations and Maintenance (O&M) buildings of approximately 1 ha. These buildings will comprise the following:
    - General ware house;
    - Chemical product storage area;
    - Ablution facilities;
    - Control room;
    - Relay room;
    - Switch gear area;
    - Parking area, reception area, offices, ablution facilities;
    - Workshops, storage areas for materials and spare parts;
    - Water storage tanks;
    - Septic tanks and sewer lines to service ablution facilities; and
    - Central waste collection and storage area.

- ***Construction site office area and laydown area (used during construction and rehabilitated thereafter):***

- Temporary infrastructure including a construction camp (~12.6 ha) which includes an on-site concrete batching plant for use during the construction phase.

- ***Access road:***

  - The proposed access to the site is from the tarred R354 connecting Matjiesfontein and Sutherland, turning west onto the district gravel road DR02249 and then heading southwest onto the R356 (MR00319) provincial gravel road from where the main access road (MN04469/OG51) branches off towards the south.

- ***Internal access roads:***

  - Internal access roads up to 12 m wide, including structures for stormwater control would be required to access each turbine and the associated infrastructure, with a total footprint of about 82.44 ha. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50 m in order for abnormal loads (especially turbine blades) to access the various turbine positions.
  - A 200 m wide corridor along the access roads are proposed to allow for micro-sitting.

- ***Wind measuring masts***

  - Up to 4 x 140 m tall (depending on the final hub height) wind measuring lattice masts strategically placed within the wind farm development footprint to collect data on wind conditions during the operational phase.

- ***Other infrastructure:***

  - Fencing of approximately 4 m high around the construction camp, on-site substation and the batching plant;
  - Temporary infrastructure to obtain water from available local sources/ new or existing boreholes including a potential temporary above ground pipeline (approximately 35 cm diameter) to feed water to the on-site batching plant. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately; and
  - Stormwater channels and culverts.

Note that this transmission infrastructure will be assessed under a separate BA process.

The proposed project can be divided into the following three main phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Activities will be undertaken during each phase which may cause an environmental impact. These activities have therefore been considered by the appointed specialists, and considered during the BA and management and mitigation measures required to address all the impacts included within this EMPr.

The main activities that are proposed to take place during the construction phase will entail (not necessarily in the following order) the removal of vegetation within the footprint of the infrastructure that will be constructed (including but not limited to the turbines, laydown areas, internal access roads and building structures). The temporary laydown area will then be constructed to enable the storage of construction equipment and machinery and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed contractors). The wind turbine foundations will then be constructed at each turbine location. As noted above, each turbine will be supported by a concrete foundation of approximately 90 m x 50 m (total footprint 25.2 ha), with the aid of a mechanical excavator.

Thereafter, the on-site substation, including the substation building will be constructed. The construction of the substation building will entail construction of the foundations and building structure as well as the installation of electrical infrastructure (such as transformers, conductors, etc.). The construction phase will also involve the transportation of personnel, construction material and equipment to and from the site. Subsequently, the trenches will be excavated between each wind turbine, for the laying of the cables to facilitate the connection of the wind turbines to the on-site substation.

The following activities will occur during the operational phase:

- Operation of the WEF and generation of electricity to add to the national grid;
- Routine Maintenance of the WEF; and
- Unscheduled Maintenance of the WEF.

The operational lifespan of the proposed Kudusberg WEF is expected to be approximately 20 years (or the duration of the power purchase agreement) which could be extended through regular maintenance and/or upgrades in technology. Wind turbines will be operational for this entire period except under circumstances of mechanical breakdown, extreme weather conditions and/or maintenance activities. Wind turbines will be subject to regular maintenance and inspection (i.e. routine servicing) to ensure the continued optimal functioning of the turbine components. It is expected that the WEF will operate throughout the day and night. During the operational phase, most of the WEF project area will continue its current agricultural use. The only development related activities on-site will be routine servicing and unscheduled maintenance. Approximately 20 employment opportunities (skilled and unskilled) will be created during the operational phase of the project.

Should it be decided not to extend the operational lifespan of the project beyond 20 years, the project will be decommissioned. The main aim of decommissioning is to return the land to its original, pre-construction condition or as near to its original condition as possible. Decommissioning involves removing the wind turbines and associated infrastructure, and covering the concrete turbine foundations with soil to a depth sufficient for the re-growth of natural vegetation. Any supporting infrastructure no longer in use will be removed from the site and either disposed of at a registered disposal facility or recycled if possible.

1.2 ENVIRONMENTAL SENSITIVITY AND PROJECT LAYOUT

The authorised Kudusberg WEF is situated approximately 45km south-west of the town of Sutherland in the Northern and Western Cape Provinces. In addition, the WEF is located in the Witzenberg and Karoo Hoogland Local Municipalities, which fall within the Cape Winelands and Namakwa District Municipalities respectively. It should also be noted that the authorised Kudusberg WEF falls entirely within the REDZ 2 (i.e. Komsberg REDZ), which was Gazetted in February 2018 by the Minister of Environmental Affairs (GN 114), and therefore the proposed Kudusberg WEF (following amendment) will also fall entirely within the above-mentioned REDZ.

The preferred site (cadastral units) extends approximately 21 000 ha, will be required for the proposed development of the 226MW Kudusberg WEF.

As part of the original Basic Assessment (BA) process[1] for the proposed Kudusberg WEF undertaken in 2018/2019, the following specialist studies were undertaken (please see Figure 4[2] for original proposed layout alternatives and

Figure 5 for the preferred layout, both indicate environmental sensitivities):

- Agricultural Assessment;
- Avifaunal Assessment;
- Bat Assessment;
- Biodiversity (including fauna and flora) Assessment;
- Heritage Assessment;
- Noise Impact Assessment;
- Socio-Economic Impact Assessment;
- Surface Water / Aquatic Impact Assessment;
- Transportation Assessment, and
- Visual Impact Assessment.

The above-mentioned specialist studies were commissioned to assess the impacts of the proposed amendments.

It should be noted that the specialist assessments did not identify any new environmental risks or impacts and ultimately it was found that the proposed amendments would not result in a potential increase in the significance of negative impacts. In addition, based on the feedback received from the specialists, it is evident that the advantages outweigh the disadvantages, mainly due to the fact that the amended layout is more beneficial as wind turbines have been removed and re-positioned outside of very high sensitivity areas.

The inputs from the specialists informed the proposed layout as all identified environmentally sensitive areas (no-go areas) have been avoided, while still retaining a technically and financially viable layout. The current proposed layout comprising of 36 turbines is the preferred layout that was assessed by all the specialists on the project team (Figure 4). This map shows all of the identified sensitivities on site within the proposed Kudusberg WEF site that were assessed.

[1] BA process undertaken for original Kudusberg WEF (**DEFF Ref:** 14/12/16/3/3/1/1976/AM1) as proposed WEF falls entirely within REDZ 2 (namely the Komsberg REDZ), which was formally gazetted on 16 February 2018 by Minister of Environmental Affairs (GN 114)

[2] Figure 4 below is for the original 56 turbine positions and will be updated when the final layout is submitted for approval

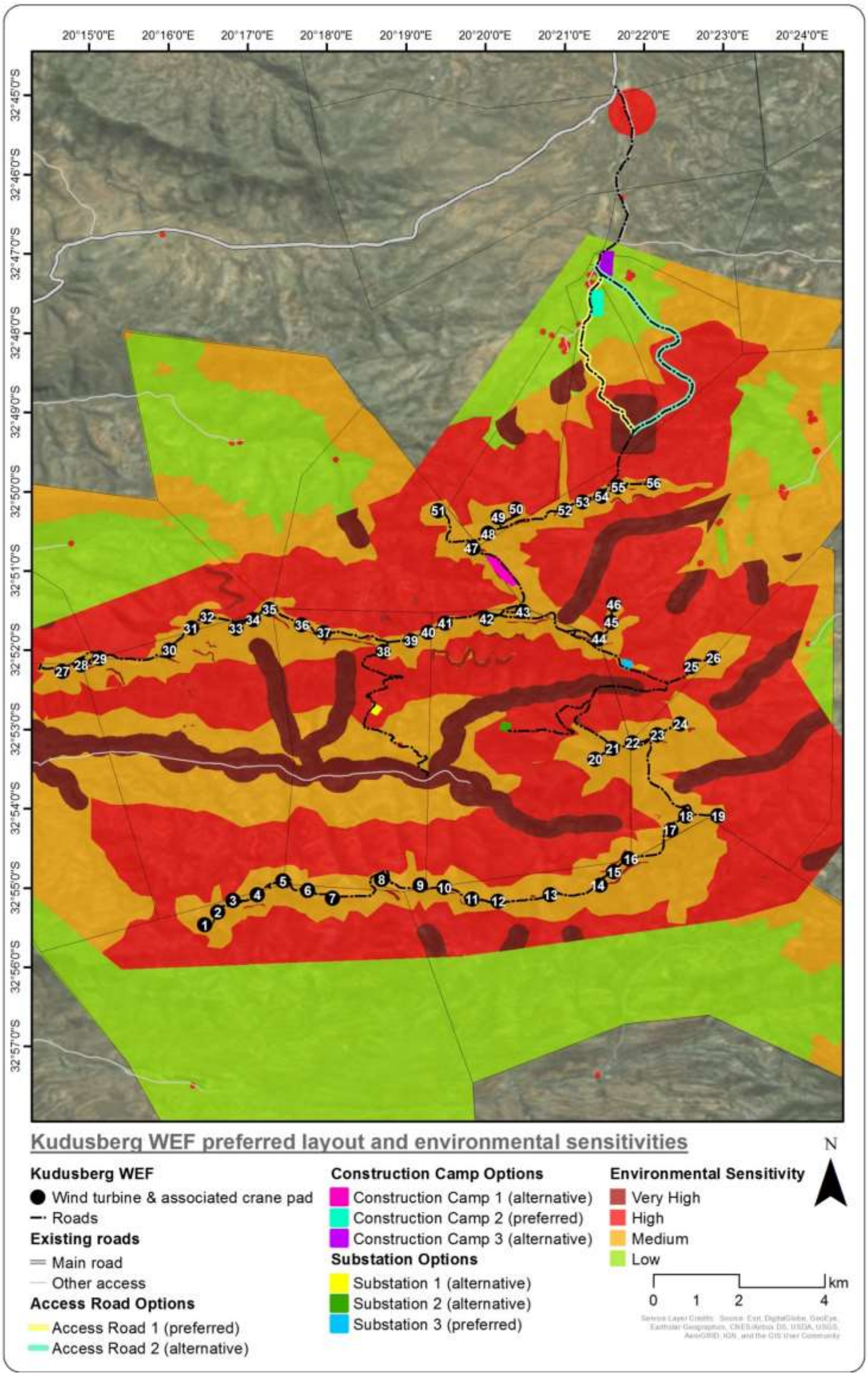


Figure 4: The environmental sensitivities on site overlain with the site layout (showing all the project alternatives) of the original proposed Kudusberg WEF.

***Note*:** *At the scale of this map some of the turbine locations may appear to be in high sensitivity areas. However, all turbines avoid high sensitivities.*

Note: Please note that the very-high sensitive areas are not necessarily 'no-go' areas for all infrastructure and therefore all specialist assessments in Appendix D must be consulted.

Note: Please note that this map is for the original 56 turbine positions. The 36 turbine positions proposed after the split are located outside of high sensitive areas and a full updated sensitivity map can be seen below in figure 5 below.

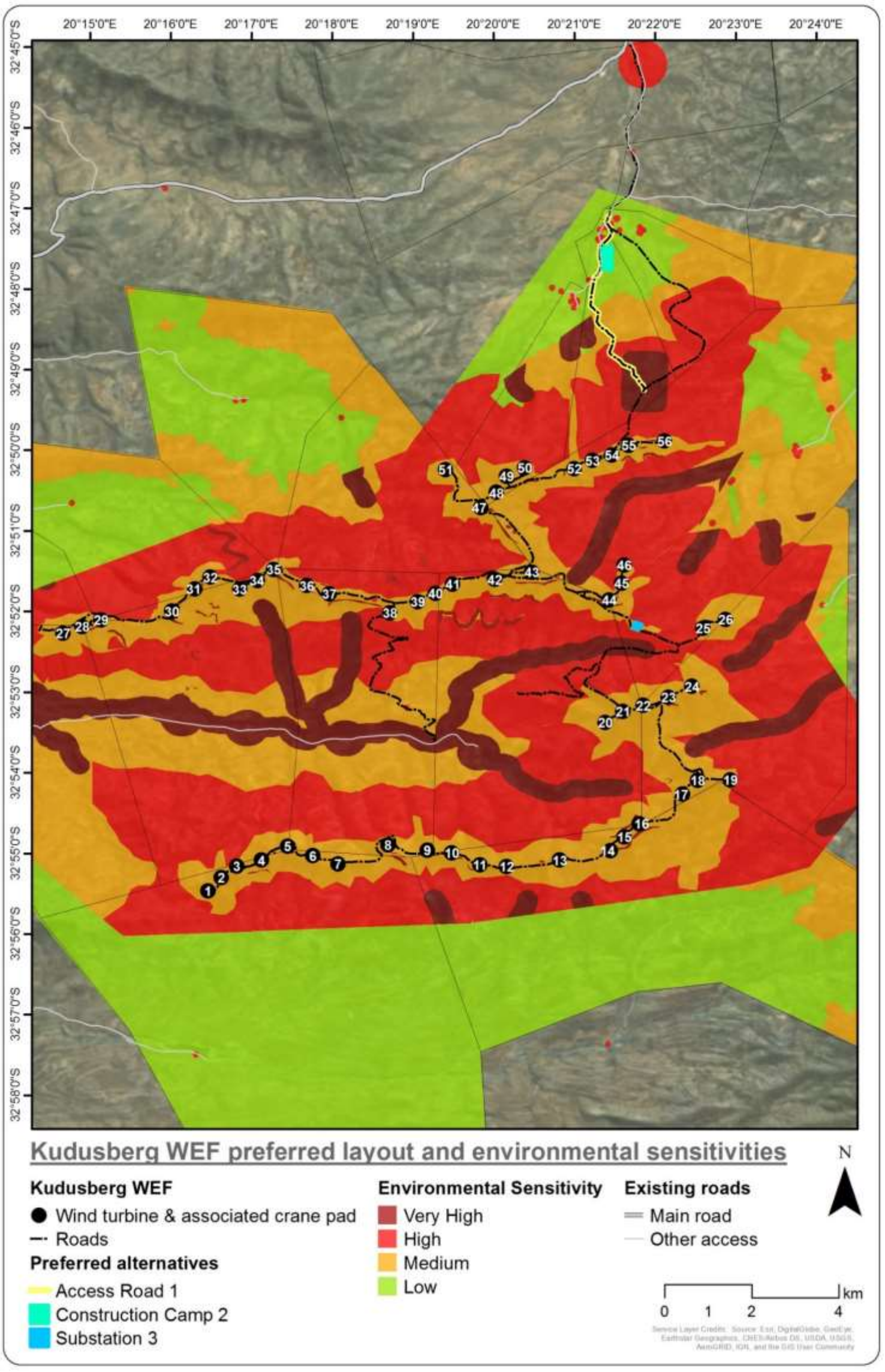


Figure 5: Preferred layout map (showing only the preferred project alternatives) with the environmental sensitivities overlain on site for the proposed Kudusberg WEF.

Note: *At the scale of this map some of the turbine locations may appear to be in high sensitivity areas. However, all turbines avoid high sensitivities.*

***Note*: Please note that the very-high sensitive areas are not necessarily 'no-go' areas for all infrastructure and therefore all specialist assessments in Appendix D must be consulted.**

Note: Please note that this map is for the original 56 turbine positions. The 36 turbine positions proposed after the split are located outside of high sensitive areas and a full updated sensitivity map can be seen below in figure 6.

The current proposed layout comprising 36 turbines, is the preferred layout that was assessed by all the specialists on the project team (Figure 6). This map shows the sensitivities on site (terrestrial and freshwater ecology, as well as sensitive heritage features) within the Kudusberg WEF site that were assessed.

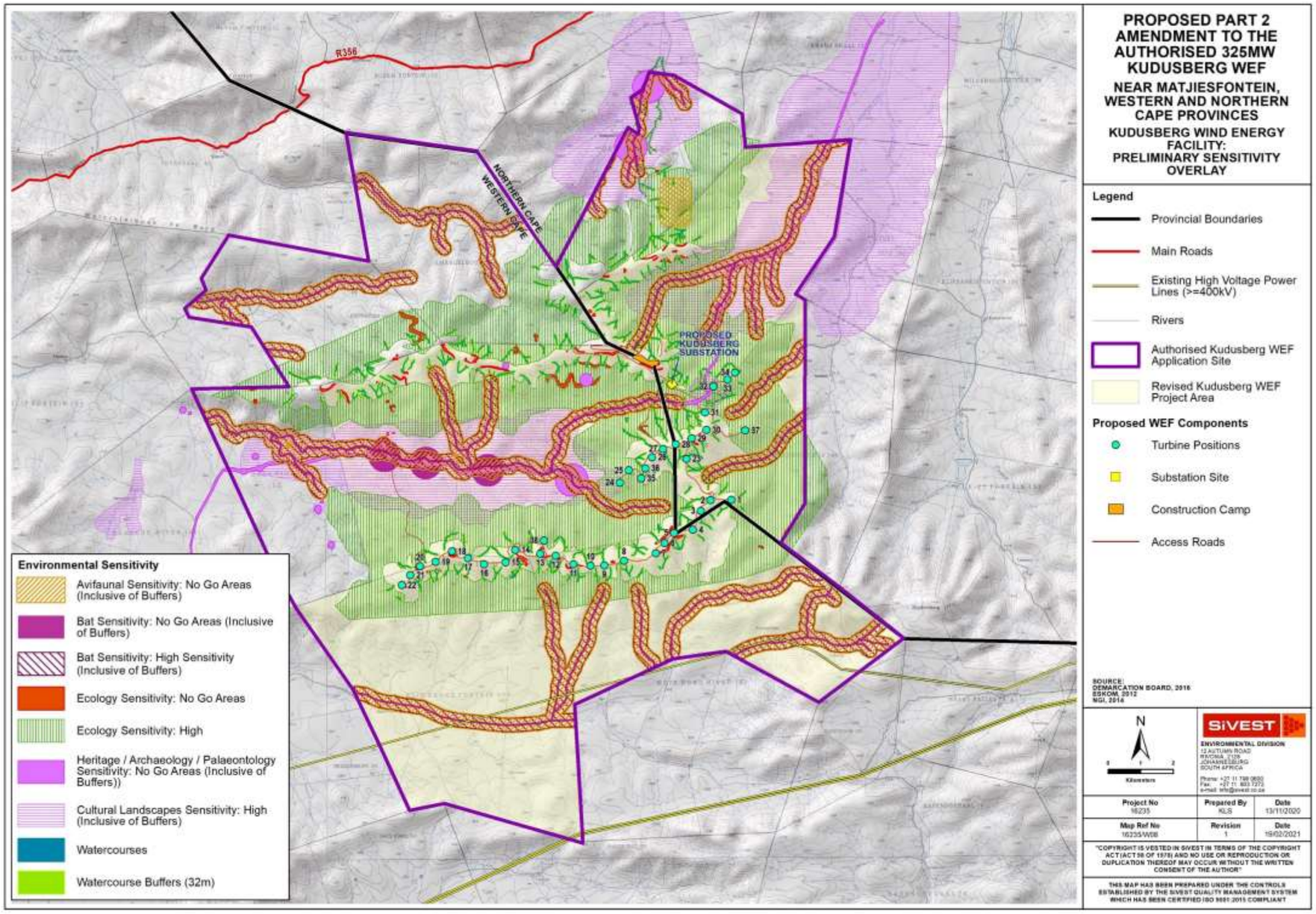


Figure 6: Preferred layout map (showing only the preferred project alternatives) with the environmental sensitivities overlain on site for the proposed Kudusberg WEF.

Note: At the scale of this map some of the turbine locations may appear to be in high sensitivity areas. However, all turbines avoid high sensitivities.

1.3 AUTHORS OF THE EMPr

This EMPr has been compiled by the Environmental Assessment Practitioner (EAP) and the various specialists on the team (as indicated in Table 3). It should be noted that this EMPr is an existing document which is being updated as part of the EA amendment process. As such, the details and expertise of both the EAP who prepared the original EMPr as well as the EAP who updated the EMP as part of the amendment process are provided in Appendix A of the EMPr. The expertise of both of the EAPs who compiled the original report as well as this updated version are provided below:

Original 2018 BA process for authorised Kudusberg WEF:
The BA was managed by the EAP, Minnelise Levendal. Professional Natural Scientist (Pri. Sci. Nat. registered, 117078):

Minnelise is a Senior EAP in the Environmental Management Services (EMS Group) of the CSIR and holds a Master's degree in Botany from the Stellenbosch University. She obtained her BSc (Education) and BSc (Honours) degrees at the University of the Western Cape. She has 15 years of experience in Environmental Management (which includes nine years working as an EAP). Before she joined the CSIR she was employed at the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) where she assessed EIAs, BAs and EMPs. Minnelise is currently managing various EIAs and BAs for wind and solar renewable energy projects in South Africa. Minnelise was the CSIR project manager for the 100 MW Ubuntu WEF near Jeffrey's Bay (EA granted in June 2012), as well as the 50 MW Banna Ba Pifhu WEF proposed by WKN Wind current near Humansdorp in the Eastern Cape (EA granted in July 2014). She was the project manager of ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the Department of Energy (DoE). EAs for all the ten masts were obtained from DEA in 2010. Minnelise was also the Project Leader for seven solar PV facilities near Kenhardt for Mulilo in the Northern Cape in 2016. Four of these projects received EA, two are not feasible due to environmental constraints and the applicant withdrew one project. She was also the project leader for the proposed Kap Vley WEF near Kleinzee in the Northern Cape. This project received EA in November 2018. Minnelise was the Project Manager of the Special Needs and Skills Development Programme of DEA which provides *pro bono* environmental assessments (BAs) to applicants with special needs, i.e. who do not have the financial means to appoint an EA to undertake a BA for their small-scale projects. Thirty BAs have been undertaken under this Programme. The contract of this programme ended towards the end of 2018.

Minnelise was supported by the Project Manager, **Lizande Kellerman. (Quality Assurance & Internal Review, CSIR): (Pr.Sci.Nat. Number 400076/10)**

Lizande holds a Bachelor's degree in Zoology and Entomology, with an Honours and Masters in Botany both at the University of Pretoria. She is currently completing her PhD in Conservation Ecology. She has more than 10 years' experience in environmental assessment and management studies, primarily in planning, preparing, managing and conducting environmental impact assessments (BA & EIAs), environmental management plans (EMPs), environmental screening studies, fatal flaw assessments, ploughing rights and license applications for air emissions, water use, waste management, mining, bioprospecting and biodiversity permitting for numerous projects in the agricultural (including aquaculture), construction, conservation and mining sectors. The past decade she's gained experience in environmental auditing and legal compliance of various projects throughout rural South Africa, focusing on agro-processing of essential oil crops and indigenous plant species with cosmetic, medicinal and nutritional value. She has been a full-time employee of the CSIR since January 2012 working in the Enterprise Creation for Development (ECD) unit in Pretoria. Since April 2016, she's been working as a Principal Environmental Assessment Practitioner (EAP) in the CSIR's Environmental Management Services (EMS) group in Stellenbosch. She is also a registered Professional Natural Scientist (Pr.Sci.Nat. Number 400076/10 - Botanical Sciences) with the SACNASP. Her main focus the past two years is to undertake a national-scale Strategic Environmental

Assessment (SEA) for Aquaculture development in South Africa on behalf of the National Departments of Environmental Affairs (DEA) and Agriculture, Forestry and Fisheries (DAFF). In addition, she has also been involved in BAs and EIAs for various renewable energy projects, specifically wind farms in the Northern and Western Cape provinces.

The project was also informed by various specialist studies undertaken by external specialists.

The project team which is involved in the original 2018 BA Process is listed in Table 3 below.

Part 2 EA Amendment Process:

As mentioned, this EMPr was approved as part of the EA for the Kudusberg WEF (14/12/16/3/3/1/1976). However, due to the proposed amendments, the approved EMPr is being amended in accordance with Condition 17 of the EA. This EMPr is thus being submitted to the DEFF as part of the Application for a Part 2 Amendment to the EA that was issued on 25 March 2019 (14/12/16/3/3/1/1976).

This EMPr has been compiled by the EAP appointed to undertake the Part 2 EA Amendment process and the various specialists on the team (as indicated in Table 3). The details and expertise of the EAP and the specialists are provided in Appendix A of the EMPr. The expertise of the EAP who compiled the report is provided below:

The Part 2 Amendment is being managed by the EAP, Liandra Scott-Shaw. Professional Natural Scientist (Pri. Sci. Nat. registered, 117442):

Liandra is a Senior EAP in SiVEST SA and holds a Honour's degree in Ecological Science from the University of Kwazulu-Natal. Liandra has approximately 8 years work experience specialising in undertaking and managing Environmental Impact Assessments (EIAs) and Basic Assessment (BAs), primarily related to energy generation and electrical distribution projects as well as Vegetation Ecology and Environmental Management. She has extensive experience in overseeing public participation and stakeholder engagement processes and has been involved in environmental baseline assessments, fatal flaw / feasibility assessments and environmental sensitivity analyses. She is responsible for the overall management of the SiVEST renewable energy projects and project management.

Liandra is supported by EAP's Stephan Jacobs and John Richardson. Stephan holds a BSc Honours degree in Environmental Management and Analysis and specialises in the field of Environmental Management and has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, in particular renewable energy projects. Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has considerable experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.

John has completed a Bachelor of Science Degree with a Geography Major (University of Natal, PMB), as well as a Bachelor of Science (Honours) in Environmental Management (University of Natal, PMB) and has been involved in consulting since 2007, which included scoping reports, environmental management plans, integrated management plans, basic assessment reports, environmental impact reports and auditing. His fields of specialisation in Environmental Project Management and Environmental Management.

The project has also been informed by various specialist studies undertaken by external specialists.

The project team which is involved in this Part 2 Amendment Process is listed in Table 3 below.

Table 3: The 2018 BA and 2020 EA Amendment Project Team

Role	Organisation	Name	Original Application	Amendment
Environmental Assessment Practitioners (EAPs)				
Acting Divisional Manager / Quality Control	SiVEST	Johan Richardson		X
Project Coordinator / EAP	SiVEST	Liandra Scott-Shaw		X
Environmental Consultant	SiVEST	Stephan Jacobs		X
Public Participation Consultant	SiVEST	Hlengiwe Ntuli		X
EAP (Pr. Sci. Nat.)	CSIR	Minnelise Levendal	X	
Technical Advisor and Quality Assurance	CSIR	Lizande Kellerman	X	
Mapping	CSIR	Surina Laurie	X	
Specialists				
Visual	SiVEST	Andrea Gibb	X	
Visual	SiVEST	Kerry Schwartz		X
Heritage: Archaeology	Private	Katie Smuts	X	X
Heritage: Cultural Landscape	Hearth Heritage	Emmylouw Rabe	X	
Heritage: Palaeontology	Natura viva cc	Dr John Almond	X	X
Heritage (including Archaeology, Palaeontology and Cultural Landscapes)	CTS Heritage	Jenna Lavin and Nicholas Wilshire		X
Agriculture & Soils	Private	Johann Lanz	X	X
Terrestrial Ecology	Ekotrust cc	Dr Noel van Rooyen	X	
Terrestrial Ecology	David Hoare Consulting	David Hoare		X
Aquatic Ecology	BlueScience (Pty) Ltd	Toni Belcher	X	
Aquatic Ecology	Scientific Aquatic Services (SAS)	Stephan van Staden		X
Aquatic Ecology	FEN Consulting – part of Scientific Aquatic Services (SAS) Environmental Group of Companies	Christel du Preez		X
Birds & Bats	BioInsight	Craig Campbell	X	X
Noise Impact	SAFETECH	Dr Brett Williams	X	X
Socio-Economic	Urban-Econ Development Economists	Elena Broughton and Conrad Swart	X	

Socio-Economic	Urban-Econ Development Economists	Elena Broughton and Marcel Theron		X
Transportation	JG AFRIKA (Pty) Ltd	Iris Wink	X	X

1.4 IMPACTS IDENTIFIED DURING THE PART 2 EA AMENDMENT PROCESS

Based on the specialist studies undertaken as part of the original 2018 BA process for the authorised Kudusberg WEF, the following main direct potential impacts, as indicated in Table 4, have been identified and appropriate management and mitigation measures included within the EMPr (where required) as per the recommendations made in the 2018 specialist studies to ensure the potential impacts are suitably addressed and managed during all phases of the project.

It should be noted that specialists (namely Agriculture, Avifauna, Bat, Terrestrial Ecology, Heritage, Noise, Socio-Economic, Surface Water / Aquatic, Transportation and Visual) were commissioned to assess the impacts of the proposed amendments. Based on the assessment of the proposed amendments undertaken by the respective specialists, no new environmental risks or impacts were identified and it was concluded that the impacts identified and mitigation measures and/or recommendations proposed as part of the BA process for the original Kudusberg WEF in 2018 would remain unchanged.

Table 4: Key Impacts identified during the original BA (2018) and Part 2 Amendment EA process

KEY IMPACT	IMPACTS IDENTIFIED
Terrestrial Ecology (fauna and flora),	**CONSTRUCTION PHASE:** Direct impacts ▪ Clearing of natural vegetation; ▪ Loss of Species of Conservation Concern; ▪ Loss of faunal habitat; ▪ Direct faunal mortalities; ▪ Loss of animal refugia; ▪ Increased dust deposition; ▪ Loss of animal and plant species by illegal collecting; and ▪ Increased noise and light levels. Indirect impacts: ▪ Establishment of alien vegetation; ▪ Changes in animal behaviour; ▪ Changes in community composition of plants; and ▪ Increased erosion and water run-off. **OPERATIONAL PHASE:** Direct impacts: ▪ Clearing and disturbance of natural vegetation; ▪ Direct faunal mortalities; ▪ Increased noise levels; and ▪ Loss of animal and plant species by illegal collecting. Indirect impacts: ▪ Establishment of alien vegetation; ▪ Changes in animal behaviour; and ▪ Increased erosion and water run-off. **DECOMMISSIONING PHASE:** Direct impacts: ▪ Clearing and disturbance of natural vegetation; ▪ Direct faunal mortalities; and ▪ Increased dust deposition. Indirect impacts: ▪ Changes in animal behaviour; and ▪ Increased erosion and water run-off.
Birds	**CONSTRUCTION PHASE:** Direct impacts ▪ Destruction of important habitat areas (natural vegetation & water features etc.) due to the construction of wind turbines and associated infrastructures; and ▪ Disturbance of the bird community due to the increase of people and vehicles in the area. Indirect impact ▪ Displacement of bird community due to increased disturbances in the area.

KEY IMPACT	IMPACTS IDENTIFIED
	OPERATIONAL PHASE: Direct impacts: ▪ Fatalities due to collision with wind turbine blades or associated infrastructures; and ▪ Disturbance of bird community due to noise and movement generated by turbines and people/vehicles operating in the area. Indirect impacts ▪ Displacement of bird species due to increased disturbances; and ▪ Population decline due to long-term increasing fatality events. **DECOMMISSIONING PHASE:** Direct impact ▪ Disturbance of bird community due to the increase of people and vehicles in the area, when dismantling wind turbines and associated infrastructures. Indirect impact ▪ Displacement of bird community due to the increase in disturbances in the area, while dismantling wind turbines and associated infrastructures.
Bats	**CONSTRUCTION PHASE:** Direct impacts ▪ Destruction of important habitat areas (natural vegetation, water features, roosts, etc.) due to the construction of wind turbines and associated infrastructures; and ▪ Disturbance of the bat community due to the increase of people and vehicles in the area, high levels of noise and machinery movements. Indirect impact ▪ Displacement of bat community due to increased disturbances in the area. **OPERATIONAL PHASE:** Direct impacts ▪ Fatalities due to collision with turbine blades or barotrauma; and ▪ Disturbance of bat community due to high levels of noise and movement generated by turbines operation and increase of people and vehicles associated with maintenance activities. Indirect impacts ▪ Displacement of bat community due to increased disturbances in the area; and ▪ Population decline due to long-term increasing fatality events. **DECOMMISSIONING PHASE:** Direct impact ▪ Disturbance of bat community due to the increase of people and vehicles in the area, high levels of noise and machinery movements when dismantling wind turbines and associated infrastructures. Indirect impact

KEY IMPACT	IMPACTS IDENTIFIED
	▪ Displacement of bat community due to increased disturbances in the area.
Dry and Ephemeral Watercourses	**CONSTRUCTION PHASE:** Direct impact ▪ Loss of watercourse vegetation, associated habitat and ecosystem services; ▪ Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and ▪ Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles; ▪ Potential impacts on the water quality of surface water runoff (when present) which may potentially enter the watercourses and contamination of soils due to concrete casting; and ▪ Potential of backfill material entering the watercourses, increasing the sediment loads therein. Indirect impact ▪ Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream watercourse areas; ▪ Exposure of soils, leading to increased runoff, and erosion, and thus increased sedimentation of the watercourses; ▪ Increased sedimentation of the watercourses, leading to smothering of vegetation associated in the watercourses; ▪ Proliferation of alien and/or invasive vegetation as a result of disturbances; ▪ Disturbances of soils leading to increased alien vegetation proliferation within the terrestrial buffer zone surrounding the watercourses, with the potential to affect the watercourse habitat; ▪ Altered runoff patterns within the local catchment of the watercourses, potentially leading to increased erosion and sedimentation of the watercourses; **OPERATIONAL PHASE:** Direct impact ▪ Disturbance to soils and ongoing erosion as a result of periodic maintenance activities; and ▪ Altered water quality (if surface water is present) as a result of increased availability of pollutants. Indirect impact ▪ Concentrated runoff from the road crossings leading to erosion and subsequent sedimentation of the watercourses (increase in the sediment load) and turbulent flows when surface water is present; and ▪ Higher flood peaks into the watercourses due to reduced surface roughness in the watercourses. **DECOMMISSIONING PHASE:** Direct impact ▪ Disturbance of soil and vegetation that established within the operational area.
Visual	**CONSTRUCTION PHASE:** ▪ Visual intrusion and dust emissions. **OPERATIONAL PHASE:** ▪ Visual intrusion, dust emissions and light pollution and glare.

KEY IMPACT	IMPACTS IDENTIFIED
	DECOMMISSIONING PHASE: ▪ Visual intrusion and dust emissions.
Heritage (Archaeology and Cultural Landscape)	**CONSTRUCTION PHASE:** ▪ Potential direct destruction of palaeontological material, archaeological remains, graves and built environment features; ▪ Potential indirect impacts due to loss of significance through erosion of visual qualities and integrity of cultural landscape; and ▪ Potential indirect impacts due to destruction of archaeological remains, graves and built environment. **OPERATIONAL PHASE:** ▪ Potential direct impacts due to the destruction of archaeological remains, graves and built environment features; ▪ Potential indirect impacts due to loss of significance through erosion of visual qualities and integrity of cultural landscape; and ▪ Potential indirect impacts due to destruction of archaeological remains, graves and built environment. **DECOMMISSIONING PHASE:** ▪ Potential direct destruction of palaeontological material, archaeological remains, graves and built environment features; ▪ Potential indirect impacts due to loss of significance through erosion of visual qualities and integrity of cultural landscape; and ▪ Potential indirect impacts due to destruction of archaeological remains, graves and built environment.
Soils and Agricultural Potential .	**CONSTRUCTION PHASE:** ▪ Erosion by water and topsoil loss. **OPERATIONAL PHASE:** ▪ Direct impact: Erosion by water and topsoil loss; and ▪ Indirect impact: Additional land use income. **DECOMMISSIONING PHASE:** ▪ Erosion by water and topsoil loss.
Socio-Economic	**CONSTRUCTION PHASE:** Direct impacts ▪ Economy will be stimulated due to capital investment and resultant increased production; ▪ Unemployment figures will slightly decrease due to jobs created; ▪ Skills levels in municipalities and for benefitting individuals will improve due to employment created; and ▪ Movement of vehicles and workers may change livestock habits and ranges. Indirect impacts ▪ Employment due to wind farm construction work will result in household income earnings for benefitting households; ▪ The in-migration of migrant labour and job seekers will place pressure on local government to adequately provide housing, services and social facilities; ▪ The increased number of people on site creates potential for theft, particularly livestock theft. ▪ The rates, payroll taxes and Value Added Tax paid to local government will increase government revenue; and

KEY IMPACT	IMPACTS IDENTIFIED
	▪ Diseases, substance abuse and other social ills could increase leading to increased community dissatisfaction. **OPERATIONAL PHASE:** Direct impacts ▪ Expenditure associated with the operation of the wind farm will impact on production in the economy; ▪ Operation and maintenance activities will create long term job opportunities; ▪ Skills levels in municipality and for benefitting individuals will improve due to employment created; and ▪ Upliftment initiative will increase the local communities' access to basic services. Indirect impacts ▪ Employment in operations and maintenance of the windfarm will result in household income earnings for benefitting households; and ▪ The rates, payroll taxes and Value Added Tax paid to local government will increase government revenue. **DECOMMISSIONING PHASE:** Direct impacts ▪ The cost of the removal and disconnection of the wind turbines will stimulate economic activity; and ▪ Unemployment figures will slightly decrease due to jobs created for a short period of time.
Noise	**CONSTRUCTION PHASE:** ▪ Noise impact from the construction of the WEF. **OPERATIONAL PHASE:** ▪ Noise impact from the operation of the wind turbines. **DECOMMISSIONING PHASE:** ▪ Noise impact from the decommissioning of the wind turbines.
Transportation	**CONSTRUCTION PHASE** ▪ Traffic congestion; and ▪ Noise and dust pollution. **OPERATIONAL PHASE** ▪ The traffic generated during this phase will be minimal and will have very little, if any impact on the surrounding road network. **DECOMMISSIONING PHASE:** Noise and dust pollution.

In order to ascertain if further input would be required in relation to the proposed amendments, each of the specialist studies conducted during the BA process of the development was investigated in terms of its applicability to the proposed amendments. A summary of the changes in impact ratings is provided in Table 5 below.

Key

Significance Rating (+ and -)	Colour Code
Low	
Medium	
High	

Table 5: Summary of changes in overall impact ratings

Specialist Study	Impact	Original Rating		Revised Rating	
		Pre-Mitigation Rating	Post Mitigation Rating	Pre-Mitigation Rating	Post-Mitigation Rating
Agriculture	Erosion by water and topsoil loss. Changes to the surfac that lead to accumulation and channelling of run-off wate can cause erosion. Because of the slopes, the aridity and th shallow soils, erosion risk is high	Low (-)	Very Low (-)	N/A	N/A
	Erosion by water and topsoil loss. Changes to the surfac that lead to accumulation and channelling of run-off wate can cause erosion. Because of the slopes, the aridity and th shallow soils, erosion risk is high	Low (-)	Very Low (-)	N/A	N/A
	Additional land use income will be generated by the farmin enterprise through the lease of the land to the energ facility. This will provide the farming enterprise wit increased cash flow and rural livelihood, and thereb improve its financial sustainability	Low (+)	N/A	N/A	N/A
	Erosion by water and topsoil loss. Changes to the surfac that lead to accumulation and channelling of run-off wate can cause erosion. Because of the slopes, the aridity and th shallow soils, erosion risk is high	Low (-)	Very Low (-)	N/A	N/A
	Cumulative impacts are likely to occur as a result of the los of agricultural land on a regional basis because of othe developments on agricultural land in the region	Very Low (-)	Very Low (-)	N/A	N/A
Avifauna	Destruction of important habitat areas (natural vegetatio & water features etc.) due to the construction of win turbines and associated infrastructures	Low (-)	Very Low (-)	N/A	N/A
	Disturbance of the bird community due to the increase o people and vehicles in the area	Low (-)	Very Low (-)	N/A	N/A
	Displacement of bird community due to increase disturbances in the area.	Low (-)	Very Low (-)	N/A	N/A

Specialist Study	Impact	Original Rating		Revised Rating	
		Pre-Mitigation Rating	Post Mitigation Rating	Pre-Mitigation Rating	Post-Mitigation Rating
	Fatalities due to collision with wind turbine blades o associated infrastructures	Medium (-)	Low (-)	N/A	N/A
	Disturbance of bird community due to noise and movemen generated by turbines and people / vehicles operating in th area	Low (-)	Very Low (-)	N/A	N/A
	Displacement of bird species due to increased disturbance	Low (-)	Very Low (-)	N/A	N/A
	Population decline due to long-term increasing fatalit events	Low (-)	Very Low (-)	N/A	N/A
	Disturbance of bird community due to the increase o people and vehicles in the area, when dismantling win turbines and associated infrastructures	Low (-)	Very Low (-)	N/A	N/A
	Displacement of bird community due to the increase i disturbances in the area, while dismantling wind turbine and associated infrastructures	Low (-)	Very Low (-)	N/A	N/A
	Destruction of important habitat areas (natural vegetatio & water features etc.) at multiple renewable energ facilities	Medium (-)	Low (-)	N/A	N/A
	Disturbance of bird community due to the increase of win turbine infrastructures, people and vehicles at multipl renewable energy facilities	Medium (-)	Low (-)	N/A	N/A
	Displacement of bird communities due to the increase i disturbances at multiple renewable energy facilities	Medium (-)	Low (-)	N/A	N/A
	Fatalities as a result of increased collisions with wind turbin blades at multiple renewable energy facilities	Medium (-)	Low (-)	N/A	N/A
	Decline in the broader population of avifauna due to long term fatality events at multiple renewable energy facilities	Medium (-)	Low (-)	N/A	N/A
Bats	Destruction of important habitat areas (natural vegetation water features, roosts, etc.) due to the construction of win turbines and associated infrastructures	Medium (-)	Low (-)	N/A	N/A
	Disturbance of the bat community due to the increase o people and vehicles in the area, high levels of noise an machinery movements	Low (-)	Very Low (-)	N/A	N/A
	Displacement of bat community due to increase disturbances in the area	Low (-)	Very Low (-)	N/A	N/A
	Fatalities due to collision with turbine blades or barotrauma	Medium (-)	Low (-)	N/A	N/A

Specialist Study	Impact	Original Rating		Revised Rating	
		Pre-Mitigation Rating	Post Mitigation Rating	Pre-Mitigation Rating	Post-Mitigation Rating
	Disturbance of bat community due to high levels of noise and movement generated by turbines operation and increase of people and vehicles associated with maintenance activities	Low (-)	Very Low (-)	N/A	N/A
	Displacement of bat community due to increased disturbances in the area	Low (-)	Very Low (-)	N/A	N/A
	Population decline due to long-term increasing fatality events	Low (-)	Very Low (-)	N/A	N/A
	Disturbance of bat community due to the increase of people and vehicles in the area, high levels of noise and machinery movements when dismantling wind turbines and associated infrastructures	Low (-)	Very Low (-)	N/A	N/A
	Displacement of bat community due to increased disturbances in the area	Low (-)	Very Low (-)	N/A	N/A
	Destruction of important habitat areas (natural vegetation, water features, roosts, etc.) due to the construction of wind turbines and associated infrastructures	Medium (-)	Low (-)	N/A	N/A
	Disturbance of the bat community due to the increase of people and vehicles in the area, high levels of noise and machinery movements	Medium (-)	Low (-)	N/A	N/A
	Displacement of bat community due to increased disturbances in the area	Medium (-)	Low (-)	N/A	N/A
	Fatalities due to collision with turbine blades or barotrauma	Medium (-)	Low (-)	N/A	N/A
	Population decline due to long-term increasing fatality events	Medium (-)	Low (-)	N/A	N/A
Biodiversity	Clearing of natural vegetation	High – Very High (-)	High (-)	N/A	N/A
	Loss of Species of Conservation Concern	Low (-)	Low (-)	N/A	N/A
	Loss of faunal habitat	Medium (-)	Low (-)	N/A	N/A
	Direct faunal mortalities	Low - Medium (-)	Low (-)	N/A	N/A
	Loss of animal refugia	Medium (-)	Very Low (-)	N/A	N/A
	Increased dust deposition	Low (-)	Very Low (-)	N/A	N/A
	Loss of animal and plant species by illegal collecting	Low (-)	Very Low (-)	N/A	N/A
	Increased noise and light levels	Medium (-)	Low (-)	N/A	N/A
	Establishment of alien vegetation	Low (-)	Very Low (-)	N/A	N/A
	Changes in animal behaviour	Medium (-)	Low (-)	N/A	N/A

Specialist Study	Impact	Original Rating		Revised Rating	
		Pre-Mitigation Rating	Post Mitigation Rating	Pre-Mitigation Rating	Post-Mitigation Rating
	Changes in community composition of plants	Medium (-)	Low (-)	N/A	N/A
	Increased erosion and water run-off	High (-)	Low (-)	N/A	N/A
	Clearing and disturbance of natural vegetation	Low (-)	Very Low (-)	N/A	N/A
	Direct faunal mortalities	Low (-)	Very Low (-)	N/A	N/A
	Increased noise levels	Low (-)	Low (-)	N/A	N/A
	Loss of animal and plant species by illegal collecting	Low (-)	Very Low (-)	N/A	N/A
	Establishment of alien vegetation	Low (-)	Very Low (-)	N/A	N/A
	Changes in animal behaviour	Medium (-)	Low (-)	N/A	N/A
	Increased erosion and water run-off	Medium (-)	Low (-)	N/A	N/A
	Clearing and disturbance of natural vegetation	Low (-)	Very Low (-)	N/A	N/A
	Direct faunal mortalities	Low (-)	Very Low (-)	N/A	N/A
	Increased dust deposition	Low (-)	Very Low (-)	N/A	N/A
	Changes in animal behaviour	Medium (-)	Low (-)	N/A	N/A
	Increased erosion and water run-off	Low (-)	Very Low (-)	N/A	N/A
	Vegetation loss and habitat destruction	High (-)	Medium (-)	N/A	N/A
	Loss of Species of Conservation Concern	Medium (-)	Low (-)	N/A	N/A
	Dissection of mountain crest habitat	Medium (-)	Medium (-)	N/A	N/A
	Turbine noise	Low (-)	Low (-)	N/A	N/A
	Compromising integrity of CBA, ESA and NPAES	High (-)	Low (-)	N/A	N/A
	Increased erosion and water run-off	Medium (-)	Low (-)	N/A	N/A
Noise	Noise impact from the construction of the WEF	Very Low (-)	Very Low (-)	N/A	N/A
	Noise impact from the operation of the wind turbines	Very Low (-)	Very Low (-)	N/A	N/A
	Noise impact from the decommissioning of the wind turbines	Very Low (-)	Very Low (-)	N/A	N/A
	Noise impact from the operation of the wind turbines	Very Low (-)	Very Low (-)	N/A	N/A
Socio-Economic	Economy will be stimulated due to capital investment and resultant increased production	High (+)	High (+)	N/A	N/A
	Unemployment figures will slightly decrease due to job created	Low (+)	Low (+)	N/A	N/A
	Skills levels in municipalities and for benefitting individual will improve due to employment created	Low (+)	Medium (+)	N/A	N/A
	Movement of vehicles and workers may change livestock habits and ranges	Low (-)	Very Low (-)	N/A	N/A

Specialist Study	Impact	Original Rating		Revised Rating	
		Pre-Mitigation Rating	Post Mitigation Rating	Pre-Mitigation Rating	Post-Mitigation Rating
	Employment due to wind farm construction work will resul in household income earnings for benefitting households	Low (+)	Low (+)	N/A	N/A
	The in-migration of migrant labour and job seekers wi place pressure on local government to adequately provid housing, services and social facilities	Low (-)	Very Low (-)	N/A	N/A
	The increased number of people on site creates potentia for theft, particularly livestock theft	Medium (-)	Low (-)	N/A	N/A
	The rates, payroll taxes and Value Added Tax paid to loca government will increase government revenue	Low (+)	Low (+)	N/A	N/A
	Diseases, substance abuse and other social ills coul increase leading to increased community dissatisfaction	Medium (-)	Low (-)	N/A	N/A
	Expenditure associated with the operation of the wind farn will impact on production in the economy	Medium (+)	Medium (+)	N/A	N/A
	Operation and maintenance activities will create long tern job opportunities	Very Low (+)	Very Low (+)	N/A	N/A
	Skills levels in municipality and for benefitting individual will improve due to employment created	Very Low (+)	Very Low (+)	N/A	N/A
	Upliftment initiative will increase the local communities access to basic services	Medium (+)	Medium (+)	N/A	N/A
	Employment in operations and maintenance of th windfarm will result in household income earnings fo benefitting households	Very Low (+)	Very Low (+)	N/A	N/A
	The rates, payroll taxes and Value Added Tax paid to loca government will increase government revenue	Very Low (+)	Very Low (+)	N/A	N/A
	The cost of the removal and disconnection of the win turbines will stimulate economic activity	Very Low (+)	Very Low (+)	N/A	N/A
	Unemployment figures will slightly decrease due to job created for a short period of time	Very Low (+)	Very Low (+)	N/A	N/A
	The influx into the region will possibly be immense due t the numerous projects in the area attracting migrant jo seekers. This will increase the demand for services	Medium (-)	Low (-)	N/A	N/A
	The numerous projects will create a notable number of job	High (+)	High (+)	N/A	N/A
	Capital and operating expenditure of numerous projects wi increase production in the economy	High (+)	High (+)	N/A	N/A

Specialist Study	Impact	Original Rating		Revised Rating	
		Pre-Mitigation Rating	Post Mitigation Rating	Pre-Mitigation Rating	Post-Mitigation Rating
	Local roads upgraded as a result of numerous WEFs in the area	Low (+)	Low (+)	N/A	N/A
	Numerous upliftment initiatives will increase the local communities' access to basic services	Medium (+)	Medium (+)	N/A	N/A
Transportation	Traffic congestion	High (-)	Medium (-)	N/A	N/A
	Noise and dust pollution	High (-)	Medium (-)	N/A	N/A
	The traffic generated during the operational phase will be minimal and will have very little, if any impact on the surrounding road network				
	Noise and dust pollution	Medium (-)	Medium (-)	N/A	N/A
	Noise and dust pollution with the delivery of equipment material and staff to site	High (-)	Medium (-)	N/A	N/A
Visual	Visual intrusion and dust emissions	Medium (-)	Low (-)	N/A	N/A
	Visual intrusion, dust emissions and light pollution and glare	Medium (-)	Medium (-)	N/A	N/A
	Visual intrusion and dust emissions	Medium (-)	Low (-)	N/A	N/A
	Visual intrusion and dust emissions	Medium (-)	Medium (-)	N/A	N/A
	Visual intrusion, dust emissions and light pollution and glare	Medium (-)	Medium (-)	N/A	N/A

It should be noted that a new Freshwater Ecological Assessment was undertaken in October 2020 as part of the Water Use Authorisation Process for the proposed 226MW Kudusberg WEF (Appendix D5a of Revised Draft EA Amendment Assessment Report), as the previous assessment undertaken in 2018 (Ekotrust, 2018 – Appendix C8b of Draft EA Amendment Assessment Report) did not meet the Department of Water and Sanitaiton (DWS) requirements for Water Use Authorisations. The results of the rating of impacts undertaken as part of the 2020 Freshwater Ecological Assessment (du Preez, 2020) are presented in Table 6 below.

Table 6: Summary of the results of the DWS risk assessment applied to the proposed WEF development activities

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Borderline LOW MODERATE Rating Classes
1	Construction Phase	Site preparation prior to construction activities of surface infrastructure components located outside the watercourses and at least 32 m from the delineated extent of a watercourse, but still within the 100 m GN509 ZoR, which includes the Oya WEF overhead collector system, Oya WEF construction camp, Kudusberg WEF construction camp, Kudusberg Substation and the identified crane pads within the 100m GN509 ZoR.	Vehicular movement (transportation of construction materials)	▪ Loss of watercourse vegetation, associated habitat and ecosystem services; ▪ Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and ▪ Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles.	1	3	12	36	L	NA
2			Removal of vegetation and associated disturbances to soils.	▪ Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream watercourse areas; ▪ Exposure of soils, leading to increased runoff, and erosion, and thus increased sedimentation of the watercourses; ▪ Increased sedimentation of the watercourses, leading to smothering of vegetation associated in the watercourses; and ▪ Proliferation of alien and/or invasive vegetation as a result of disturbances.	1	3	12	36	L	
3		Site preparation prior to construction activities relating to the upgrading of existing roads and installation of underground cables traversing through watercourses.	Removal of vegetation and associated disturbances to soils.	▪ Earthworks and exposure of soils could result in sedimentation of the watercourses, which may be transported as runoff into the downstream watercourse areas and may smother vegetation associated with the watercourses; and ▪ Proliferation of alien and/or invasive vegetation as a result of disturbances.	1,75	3,75	14	52,5	L	NA

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Borderline LOW MODERATE Rating Classes
4		Site preparation prior to the construction of new roads and installation of underground cables (along new roads) traversing through watercourses.	Removal of vegetation and associated disturbances to soils.	▪ Earthworks and exposure of soils could result in sedimentation of the watercourses, which may be transported as runoff into the downstream watercourse areas and may smother vegetation associated with the watercourses; and ▪ Proliferation of alien and/or invasive vegetation as a result of disturbances.	2,5	4,5	15	67,5	M	L (-7)
5		Construction of surface infrastructure outside of the watercourses and at least 32 m from the delineated extent of a watercourse (as all proposed infrastructure will be located outside the 32m NEMA ZoR), but still within the 100 m GN509 ZoR, which includes the Oya WEF overhead collector system, Oya WEF construction camp, Kudusberg WEF construction camp, Kudusberg Substation and the identified crane pads within the 100m GN509 ZoR.	▪ Removal of vegetation and topsoil and associated stockpiling; ▪ Ground-breaking and earthworks relating to foundations and trenches; ▪ Mixing and casting of concrete for construction purposes; ▪ Backfilling of excavated and disturbed areas; and ▪ Miscellaneous activities by	▪ Disturbances of soils leading to increased alien vegetation proliferation within the terrestrial buffer zone surrounding the watercourses, with the potential to affect the watercourse habitat; ▪ Altered runoff patterns within the local catchment of the watercourses, potentially leading to increased erosion and sedimentation of the watercourses; ▪ Potential impacts on the water quality of surface water runoff (when present) which may potentially enter the watercourses and contamination of soils due to concrete casting; and ▪ Potential of backfill material entering the watercourses, increasing the sediment loads therein.	1	3	12	36	L	NA

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Borderline LOW MODERATE Rating Classes
			construction personnel.							
6		Upgrading of existing road crossings and trenching through the watercourses.	▪ Compaction of soil in the existing road crossing footprint to increase the width of the roads; and ▪ Importation of materials to construct the roads.	▪ Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream reach of the watercourse; and ▪ Proliferation of alien and/or invasive vegetation as a result of disturbances.	1,75	3,75	14	52,5	L	NA

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Borderline LOW MODERATE Rating Classes
7	CONSTRUCTION PHASE	Construction of new road crossings and trenches through watercourses	▪ Removal of vegetation and topsoil and associated stockpiling; ▪ Ground-breaking and earthworks relating to foundations and trenches; ▪ Compaction of soil in the road crossing footprint area; ▪ Importation of materials to construct the roads; ▪ Backfilling of excavated and disturbed areas; and ▪ Miscellaneous activities by construction personnel.	▪ Disturbances of soils leading to increased alien vegetation proliferation within the watercourses, thus impacting on the watercourse habitat; ▪ Altered runoff patterns within the watercourses, potentially leading to increased erosion and sedimentation of the watercourses; and ▪ Potential of imported materials to entering the watercourses, increasing the sediment loads therein.	2,25	4,25	15	63,75	M	L (-7)
6	OPERATIONAL PHASE	Operation and maintenance of the surface infrastructure outside the watercourses and at least 32 m from	▪ Potential indiscriminate movement of maintenance	▪ Disturbance to soils and ongoing erosion as a result of periodic maintenance activities; and	1,5	3,5	12	42	L	NA

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Borderline LOW MODERATE Rating Classes
		the delineated extent of a watercourse, but still within the 100 m GN509 ZoR.	vehicles within the watercourses or within close proximity to the watercourses; and ▪ Increased risk of sedimentation and/or hydrocarbons entering the watercourses via stormwater runoff from the surface infrastructure (such as from crane pads and the construction camp)	▪ Altered water quality (if surface water is present) as a result of increased availability of pollutants.						
7		Operation and maintenance of roads (new and existing) traversing watercourses.	▪ Concentrated runoff entering the watercourses; and ▪ Disturbance to the vegetation within and surrounding the watercourses.	▪ Concentrated runoff from the road crossings leading to erosion and subsequent sedimentation of the watercourses (increase in the sediment load) and turbulent flows when surface water is present; ▪ Higher flood peaks into the watercourses due to reduced surface roughness in the watercourses.	1,75	3,75	12	45	L	NA

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Borderline LOW MODERATE Rating Classes
8	**DECOMMISSIONING PHASE**	Removal of all surface infrastructure from the project area.	▪ Movement of construction vehicles and personnel; and ▪ Disturbance to the buffer zone surrounding the watercourses.	▪ Disturbance of soil and vegetation that established within the operational area.	1,75	3,75	13	48,75	L	NA

1.5 WAKE LOSS EFFECT

In addition to the environmental impacts, DEFF has recently by means of industry correspondence, expressed concerns around the wake loss effect of one wind farm on another. Therefore, Kudusberg wind farm has entered into confidential commercial agreements with directly adjacent wind farms (namely the Karreebosch, Brandvalley and the Rondekop Wind Farms) and can warrant to DEFF that this impact was considered and addressed with all surrounding wind farm project companies. All other proposed wind farms are too far from Kudusberg wind farm to experience a wake loss effect. Therefore, no further technical studies are required.

2 APPROACH TO PREPARING THE EMPr

2.1 COMPLIANCE WITH RELEVANT LEGISLATION

In terms of legal requirements, a crucial objective of the EMPr is to satisfy the requirements of Section 24N of the NEMA, as amended, and Appendix 4 of the amended NEMA EIA Regulations published in Government Notice No. R 326 of 7 April 2017. These regulations prescribe the content of the EMPr and specify the type of supporting information that must accompany the submission of the report to the authorities. An overview of where the requirements are addressed in this EMPr is presented in Table 7 and Table 8 below.

Table 7: Compliance with Section 24N of NEMA

Requirements of Section 24N of NEMA	Where it is included in this EMPr
2) The environmental management programme must contain- a) information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of- (i) planning and design; (ii) pre-construction and construction activities; (iii) the operation or undertaking of the activity in question; (iv) the rehabilitation of the environment; and (v) closure, if applicable;	The columns detailing the impact description, mitigation and management objectives, and mitigation and management actions in Sections 4 to 15 of this EMPr.
b) details of (i) the person who prepared the environmental management programme; and (ii) the expertise of that person to prepare an environmental management programme;	Section 1.3 and Appendix B of the BA Report.
c) a detailed description of the aspects of the activity that are covered by the environmental management programme;	Section 1
d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);	Columns in Sections 4 to 15 of the EMPr regarding the monitoring responsibility, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3.
e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 15 of this EMPr .
f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and	Sections 4 to 15of this EMPr, as applicable to the post-construction, rehabilitation phase and the decommissioning phase.
g) a description of the manner in which it intends to- (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	The columns detailing the mitigation and management objectives, mitigation and management actions, and the monitoring methodology, frequency

Requirements of Section 24N of NEMA	Where it is included in this EMPr
(ii) remedy the cause of pollution or degradation and migration of pollutants; and (iii) Comply with any prescribed environmental management standards or practices.	and responsibility in Sections 4 to 15 of this EMPr.
3) The environmental management programme must, where appropriate- a) set out time periods within which the measures contemplated in the environmental management programme must be implemented; b) contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation which may occur inside and outside the boundaries of the operations in question; and c) develop 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 (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 15 of this EMPr. Section 11 of this EMPr includes an Environmental Awareness Plan.
5) The Minister, the Minister responsible for mineral resources or an MEC may call for additional information and may direct that the environmental management programme in question must be adjusted in such a way as the Minister, the Minister responsible for mineral resources or the MEC may require.	Not applicable at this stage.
6) The Minister, the Minister responsible for mineral resources or an MEC may at any time after he or she has approved an application for an environmental authorisation approve an amended environmental management programme.	Not applicable at this stage.
7) The holder and any person issued with an environmental authorisation- a) must at all times give effect to the general objectives of integrated environmental management laid down in section 23; b) must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment; c) must manage all environmental impacts (i) in accordance with his or her approved environmental management programme, where appropriate; and (ii) as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise; d) must monitor and audit compliance with the requirements of the environmental management programme; e) must, as far as is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and f) is responsible for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation as a result of his or her operations to which such right, permit or environmental authorisation relates.	Throughout the EMPr.
8) Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently	Section 3 details the responsibility of the Holder of the EA.

Requirements of Section 24N of NEMA	Where it is included in this EMPr
or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution.	

Table 8: Appendix 4 of the amended EIA Regulations

Requirements of Appendix 4 of the 2014 amended NEMA EIA Regulations GN R 326	Where it is included in this EMPr?
1. (1) An EMPr must comply with section 24N of the Act and include: (a) details of: (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.3 and Appendix A of the EMPr.
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1
(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 should be avoided, including buffers;	Figure 6 in Section 1.2 and Appendix B of this EMPr.
(d) a description of the impact management outcomes, 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: (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post (v) closure; and (vi) where relevant, operation activities;	Section 1.4 and the columns detailing the impact description, mitigation and management objectives, and mitigation and management actions in Sections 4 to 15 of this EMPr.
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to: (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	The columns detailing the mitigation and management actions in Sections 4 to 15 of this EMPr.
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	The columns detailing the monitoring methodology in Sections 4 to 15 of this EMPr.
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	The columns detailing the monitoring frequency in Sections 4 to 15 of this EMPr.
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	The columns detailing the monitoring responsibility in Sections 4 to 15 of this EMPr.

Requirements of Appendix 4 of the 2014 amended NEMA EIA Regulations GN R 326	Where it is included in this EMPr?
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	The columns detailing the mitigation and management actions, and the monitoring methodology and frequency in Sections 4 to 15 of this EMPr.
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 15 of this EMPr.
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 4 to 15 (Pages 47-123) of the EMPr, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3 (Pages 45-46).
(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 (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 11 of this EMPr.
(n) Any specific information that may be required by the competent authority.	Not applicable at this stage.

2.2 COMPLIANCE WITH DEFF REQUIREMENTS

The EMPr is structured in such a way to comply with the requirements of the DEFF and to ensure that the mitigation and management measures that have been identified during the BA and EA Amendment Processes, are included in the respective plans.

The specific recommendations/mitigation measures proposed in the specialist studies are included in Section 14 and 15 of the EMPr.

2.3 CONTENTS OF THE EMPr

Where applicable, each section of the EMPr is divided into the following four phases of the project cycle:

- Design Phase;
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

The EMPr includes the findings and recommendations of the BA and EA Amendment Processes and specialist studies. As mentioned, specialist studies were commissioned to assess the impacts of the proposed amendments. It should be noted that where the specialist assessments identified any new recommendations and/or mitigation measures, these were incorporated into the EMPr accordingly.

However, the EMPr is considered a "living" document and must be updated with additional information or actions during the design, construction, operational and decommissioning phases if applicable. It should be noted that this is the Draft EMPr and a final EMPr will be submitted for approval prior to construction commencing.

The EMPr follows an approach of identifying an over-arching goal and objectives, accompanied by management actions that are aimed at achieving these objectives (the outcomes). The management actions are presented in a table format in order to show the links between the goal and associated objectives, actions, responsibilities, and monitoring requirements and targets.

The management plans for the design, construction, operational and decommissioning phases consist of the following components:

- **Impact:** The potential positive or negative impact of the development that needs to be enhanced, mitigated or eliminated.
- **Objectives:** The objectives necessary in order to meet the goal; these take into account the findings of the specialist studies.
- **Mitigation/Management Actions**: The actions needed to achieve the objectives of enhancing, mitigating or eliminating impacts; taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.
- **Monitoring**: The key monitoring actions required to check whether the objectives are being achieved, taking into consideration methodology, frequency and responsibility.

2.4 GOAL FOR ENVIRONMENTAL MANAGEMENT

The overall goal for environmental management for the proposed Kudusberg WEF BA and Part 2 Amendment is to construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Minimises impacts on fauna, flora and freshwater ecosystems;
- Facilitates harmonious co-existence between the project and other land uses in the area;
- Contributes to the environmental baseline and understanding of environmental impacts of WEFs in a South African context; and
- Maximises socio-economic benefits.

3 ROLES AND RESPONSIBILITIES

For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Holder of the EA;
- Environmental Control Officer (ECO);
- Construction Manager (Lead Contractor or Contractor); and
- Facility Manager.

Note: The specific titles for these functions will vary from project to project. The intent of this section is to give a generic outline of what these roles typically require. It is expected that this will be appropriately defined at a later stage, prior to the commencement of construction.

3.1 PROJECT OWNER/DEVELOPER/HOLDER OF EA

The Applicant (i.e. Kudusberg Wind Farm (Pty) Ltd) is the current 'owner' of the project and, as such, is responsible for ensuring that the conditions of the EA issued in terms of NEMA (should the project receive such authorisation) are fully adhered to, as well as ensuring that any other necessary permits or licences are obtained and complied with. It is expected that the Holder of the EA at the point of construction will appoint the ECO and the Lead Contractor, and possibly an Environmental Manager (or Health, Safety and Environmental Manager). The responsible party for the implementation of the conditions of the EA and the recommendations in the EMPr is referred to throughout as the "Holder of the EA".

3.2 ENVIRONMENTAL CONTROL OFFICER

A suitably qualified independent ECO must be appointed to ensure that the provisions of the EMPr as well as the conditions of the EA (should such authorization be granted by DEA) are complied with at all times. The ECO must also monitor compliance of the proposed project with environmental legislation and recommendations of the EMPr, as well as oversee the implementation of the EMPr during the phases of the project, monitor environmental impacts, undertake record-keeping.

The ECO will be responsible for updating the EMPr as and when necessary, and compiling a monitoring checklist based on the EMPr. The roles and responsibilities of the ECO should include the following:

- The ECO must undertake periodic environmental audits during the relevant phases of the proposed project in order to monitor and record environmental impacts and non-conformances, and to monitor site activities to ensure adherence to the specifications contained in the EMPr, using a monitoring checklist. The timeframes for environmental audits will be indicated in the EA (should such authorisation be granted by the DEA).
- Environmental compliance/audit reports must be compiled and submitted by the ECO to the Competent Authority (i.e. DEA, and/or Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) and/or Northern Cape Department of Environment and Nature Conservation (DENC)) on a regular basis (i.e. at intervals as indicated in the EA).
- The ECO must maintain a diary of site visits and audits, a copy of the EA (should such authorisation be granted by the DEA) and relevant permits for reference purposes, a non-conformance register, a public complaint register, and a copy of previous environmental audits undertaken.
- Prior to the commencement of construction, the ECO must meet on site with the Contractor to confirm the construction procedure and designated construction areas and work activity zones.
- Reporting of any non-conformances within 48 hours of identification of such non-conformance to the relevant agents.

- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Contractor.
- Ensure that records are kept of all monitoring activities and results.
- Conducting an environmental inspection on completion of decommissioning and 'signing off' the site rehabilitation process.

The Lead Contractor and sub-contractors may have their own Environmental Officers, or designate Environmental Officer functions to certain personnel.

3.3 CONSTRUCTION MANAGER

The Construction Manager will be responsible for the following:

- Ensure that all appointed contractors and sub-contractors are aware of the EMPr and their respective responsibilities;
- Prior to the commencement of construction, the Lead Contractor must meet on site with the ECO in order to confirm the construction procedure and designated construction areas and work activity zones.
- Ensure that each sub-contractor employs an Environmental Officer (or employs a designated suitably qualified individual to fulfil the role of an Environmental Officer) to monitor and report on the daily activities on-site during the construction period;
- Implementation of the overall construction programme, project delivery and quality control for the construction for the WEF;
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project management related to project construction;
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment;
- Ensuring that safe, environmentally acceptable working methods and practices are implemented and that sufficient plant and equipment is made available properly operated and maintained, to facilitate proper access and enable any operational to be carried out safely;
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the Holder of the EA's ECO; and
- Implement the Traffic Management Plan (Section 7) and the Storm Water Management Plan (Section 8).

3.4 FACILITY MANAGER

The Facility Manager will be responsible for the following:

- Operation of the Kudusberg WEF;
- Required maintenance of the facility; and
- Overall compliance with the EMPr and EA (should such authorisation be granted by the DEA).

4 ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

Impact	Mitigation/Management Objectives (outcomes)	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
4.1. Impacts due to establishment of alien invasive plants.	Ensure the appropriate removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	4.1.1. Compile an alien and invasive species control and monitoring plan as required in the Alien and Invasive Species Regulations under the National Environmental Management Biodiversity Act (Act 10 of 2004). 4.1.2. Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. 4.1.3. Compile and finalise an alien weed eradication programme.	▪ Ensure that this is done and taken into consideration during the planning and design phase. ▪ Appoint a suitable specialist/ Contractor or contact the relevant authorities to seek guidance on the removal of the planted alien invasive species.	▪ Once-off during the design phase. ▪ Once-off during the design phase with possible follow up tasks during the construction phase.	▪ Project Owner
B. CONSTRUCTION PHASE					
4.2. Impacts due to the establishment of and increased spread of alien invasive plants.	Avoid establishment and reduce the spread of alien invasive plants due to the project activities.	4.2.1. Appoint a suitable specialist or contractor to undertake a sweep and survey of the final development footprint site, with an alien invasive eradication team to remove exotic vegetation prior to the commencement of construction. 4.2.2. Establish an ongoing monitoring programme for the construction phase to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) and National Environmental Management:	▪ Appoint a suitable vegetation contractor to inspect the site and remove any exotic weeds prior to the commencement of construction. ECO to ensure that this is taken into consideration and implemented. ▪ Prepare monitoring programme which will monitor the presence of alien invasive species on the site. If any alien invasive species are detected, then the distribution of these should be mapped (GPS co-ordinates of concentrations of	▪ Prior to the commencement of construction. ▪ Once-off	▪ Project Owner, ECO and Specialist Contractor ▪ ECO and Contractor

Impact	Mitigation/Management Objectives (outcomes)	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Biodiversity Act (Act 10 of 2004) (NEM: BA).	plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area.		
		4.2.3. Ensure proper management of soil stockpiles. Do not import soil stockpiles from areas with alien plants to ensure proper management of stockpiles.	▪ Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species.	▪ On-going	▪ ECO and Contractor
		4.2.4. Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas.	▪ Rehabilitate disturbed areas and monitor the presence of alien invasive species on site.	▪ On-going	▪ ECO and Contractor
		4.2.5. Keep clearance and disturbance of indigenous vegetation to a minimum.	▪ Monitor and manage vegetation clearing by undertaking visual inspections to ensure minimal disturbance and to restrict activities to within demarcated areas.	▪ On-going	▪ ECO and Contractor
		4.2.6. Ensure that the footprint required for the proposed project activities (such as temporary stockpiling, earthworks, storage areas, site establishment etc.) is kept at a minimum.	▪ Verify that the proposed project area is determined and outlined prior to the commencement of the construction phase by undertaking visual inspections.	▪ Once-off prior to construction and as required during the construction process.	▪ ECO and Contractor

Impact	Mitigation/Management Objectives (outcomes)	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		4.2.7. Ensure that alien invasive vegetation found on site, within the proposed project footprint, is immediately controlled and removed promptly, in a scheduled manner throughout the construction phase. The removal of alien vegetation on site during the construction phase should use registered control methods and take into consideration the Alien and Invasive Species Regulations published in terms of Section 97(1) of the NEM: BA, if applicable.	▪ Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species. If any alien invasive species are detected, then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. Any alien invasive should be cleared from site.	▪ On-going	▪ ECO and Contractor
		4.2.8. The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.	▪ Monitor the removal of the alien vegetation found on site via visual inspections.	▪ As necessary during the construction phase.	▪ ECO
		4.2.9. All construction machinery and plant equipment delivered to site for use during the construction phase should be cleaned in order to limit the introduction of alien species.	▪ Clean machinery and equipment prior to the construction phase. ▪ ECO to conduct visual inspections to verify that machinery and equipment are cleaned, and report any non-compliance.	▪ Prior to the commencement of construction. ▪ As necessary during the construction phase.	▪ ECO and Contractor

Impact	Mitigation/Management Objectives (outcomes)	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C. OPERATIONAL PHASE					
4.3. Impacts due to establishment of alien invasive plants. Exotic weed invasion may result in the ousting of natural vegetation and alteration of ecological processes on site, with incremental impacts on the adjacent veld types.	Reduce the establishment and spread of alien invasive plants. To remove exotic weeds as and when they may arise and thereby prevent alteration of local and adjacent habitat forms.	4.3.1. Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species during the operation phase.	▪ Annual audit of project area and immediate surroundings. If any alien invasive species are detected, then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area.	▪ Annual	▪ Project Owner
		4.3.2. Immediately control any alien plants that become established using registered control methods. Use of herbicides and manual removal of alien vegetation on site where this may arise to be undertaken as advised by a specialist. Regular address and redress of weeds identified on site by a suitable contractor. The clearance of exotic weed to be undertaken bi-annually at a minimum and on a needs basis at an intermittent level.	▪ Monitor the use of herbicide sprays and manual removal of alien vegetation by undertaking visual inspections and reporting any non-compliance. ▪ Maintain register of weed spraying activities and ensure that herbicide use is recorded.	▪ As required	▪ Project Owner and Environmen-tal Manager/ ▪ ECO
D. DECOMMISSIONING PHASE					
4.4. Exotic weed invasion of the decommissioned site resulting in ecological change.	To prevent the excessive growth and propagation of exotic weeds on disturbed lands that	4.4.1. All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	▪ Final external audit of area to confirm that area is rehabilitated to an acceptable level.	▪ Once off	▪ Lead Contractor with advice from specialist

Impact	Mitigation/Management Objectives (outcomes)	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	formed a portion of the WEF.	4.4.2. Exotic weed control measures to be instituted through weed control programme. Regular redress of exotic weed through the use of herbicide and manual removal.	▪ Compile weed eradication programme for a period of 12 months after the decommissioning exercise. ▪ Appoint contractor to undertake the weed eradication programme.	▪ Weed eradication exercise to be undertaken every 6 months for a period of 12 months following decommissioning. ▪ Prior to the commencement of the decommissioning phase.	▪ Project Owner ▪ Project Owner

5 PLANT RESCUE AND PROTECTION PLAN INCLUDING RE-VEGETATION AND HABITAT REHABILITATION PLAN (INCLUDING FAUNA AND AVIFAUNA)

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
5.1. The ousting of fauna through anthropogenic activities, disturbance of refugia and general change in habitat, with impacts on terrestrial and aquatic ecology as a result of the final site layout and routes of the access roads.	Avoidance of unnecessary disturbance to the site and surrounds, and to establish buffers where required.	The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance created by the proposed project. Where new roads need to be constructed, the existing road infrastructure should be rationalised and any unnecessary temporary roads decommissioned and rehabilitated to reduce the disturbance of the area and within the river beds. the disturbance of the channels should be limited. 5.1.1. Wetland areas should be avoided and any road adjacent to a wetland feature should also remain outside of the 50 m buffer zone. 5.1.2. Incorporate minor drainage lines into design and avoid unnecessary disturbance, where applicable. Refer to Appendix B and C of this EMPr. Refer to the Freshwater Impact Assessment in Appendix D of the BA Report. 5.1.3. Consider the most applicable access road to site i.e. alternative 1. 5.1.4. Appoint a specialist or suitable contractor to identify any plant species on site that may require “rescue” as well as any exotic weeds/vegetation that require removal. Appoint a	▪ Review the site plan with the ecologist (if required).	▪ Once-off, prior to the commencement of construction. ▪ Appoint specialist once-off, prior to the commencement of construction. ▪ Once-off during the planning and design phase.	▪ Project Owner and ECO ▪ Project Owner ▪ Project Owner

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		specialist team flush game from the construction area. 5.1.5. Consideration of the siting and layout of the temporary construction site and worker camp to avoid all sensitive areas as identified in the relevant specialist studies included in the BA Report.			
5.2. Destruction of indigenous vegetation without relevant licences or permits.	Ensure compliance with relevant Provincial and National legislation in respect of habitat and vegetation forms.	5.2.1. Ensure the necessary permits or licences are identified and applied for as applicable for the removal of protected, indigenous vegetation. 5.2.2. Await response and provision of permit (as required) from the relevant Authorities prior to the removal of the indigenous species (if required). Once these permits are obtained, search and rescue must be undertaken for the indigenous species. 5.2.3. Develop Construction Camp 2.	▪ Review the findings of the Ecological Impact Assessment and consider legislative requirements in respect of loss of indigenous vegetation etc. ▪ Appoint a suitable Search and Rescue Specialist/Contractor to undertake Search and Rescue. ▪ Ensure that this is taken into consideration during the planning and design phase.	▪ Once-off, prior to the commencement of construction ▪ Once-off, prior to the commencement of construction ▪ Once-off during the planning and design phase.	▪ Project Owner and ECO ▪ Project Owner , Specialist/ Contractor and ECO ▪ Project Owner
5.3. Loss of Species of Special Concern (SSC) and protected species and their habitats.	Minimise fragmentation and loss of SSC and protected species and their habitats through the careful siting and layout planning for the project.	5.3.1. Avoid the removal of listed SSC and protected species as far as possible.	▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ Once-off during the planning and design phase	▪ Project Owner
		5.3.2. Avoid construction within drainage lines as far as possible.	▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ Once-off during the planning and design phase	▪ Project Owner ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
5.4. Impact on avian (birds and bats) behaviour and avian species as a result of collision with infrastructure of the proposed WEF.	Reduce impact on avifauna.	5.4.1. The more sensitive habitat areas for birds and bats on the site should be avoided. The sensitivity buffers outlined in the Bird and Bat Impact Assessments (Appendix D) must be adhered to.	▪ Ensure that this is taken into consideration during the planning and design phase.	▪ Once-off ▪ Once during the design and planning phase	▪ Project Owner and Contractor ▪ Project Owner and Contractor
B. CONSTRUCTION PHASE					
5.5. Excessive loss of natural vegetation in and outside the development footprint area and veld degradation.	Minimise loss of natural vegetation. Reduce impacts on natural vegetation in sensitive habitats and SSC.	5.5.1. Sensitive habitats and areas outside of the project footprint within the development area should be clearly demarcated as no go areas during the construction phase to avoid accidental impacts.	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. ▪ ECO must monitor activities and record and report non-compliance. Fines should be issued for non-compliance and the payment of fines should be specified in the contract of the construction workers and in the contract of the ECO. ▪ Strict control and proper education of staff to prevent misconduct. If ECO is absent, there should be a designated ESO (Environmental Site Officer) present to deal with any urgent issues.	▪ Daily	▪ ECO and Contractor
		5.5.2. Ensure that the footprint required for the proposed project activities is kept at a minimum.	▪ Verify that the proposed project area is determined and outlined prior to the	▪ Once-off prior to construction and as required	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			commencement of the construction phase by undertaking visual inspections.	during the construction process.	
		5.5.3. The proposed project footprint must be demarcated to reduce unnecessary disturbance beyond the proposed project area.	▪ Carry out visual inspections to ensure strict control over the behaviour of staff in order to restrict activities to within demarcated areas.	▪ Weekly	▪ ECO
		5.5.4. The Contractors and construction personnel must be made aware that indigenous vegetation must not be removed or damaged.	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Contractor/ ECO ▪ ECO
		5.5.5. Ensure that the temporary site camp is not located within any drainage lines on site Develop construction camp 2.	▪ Monitor the placement of the site camp via visual inspections, and record and report any non-compliance.	▪ Once-off prior to construction and as required during the construction phase.	▪ ECO
		5.5.6. Unnecessary impacts on surrounding natural vegetation must be avoided during construction. All construction vehicles should remain on properly and clearly demarcated roads.	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. ▪ Include periodical site inspection in environmental performance reporting that specifically record occurrence of off-road vehicle tracks in specific areas.	▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		5.5.7. Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site during the pre-construction phase.	▪ Undertake audits following the construction phase and report any non-compliance.	▪ Monthly	▪ ECO and Contractor
		5.5.8. The collection, hunting or harvesting of any plants, fuel wood or animals at the site during construction should be strictly forbidden and the staff must be educated to prevent this from happening.	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Daily ▪ Once-off training and ensure that all new staff are inducted. ▪ As needed	▪ ECO and Contractor ▪ Contractor/ ECO ▪ ECO
		5.5.9. Fires should only be allowed within fire-safe demarcated areas. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the construction phase.	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas. ▪ Ensure fire safety requirements are well understood and respected by workers (by providing basic fire safety training).	▪ Daily	▪ ECO and Contractor
		5.5.10. Existing access roads/servitudes must be used and should be located along	▪ Compile plan pre-construction.	▪ Prior to construction commencing.	▪ Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		the boundaries of existing disturbed areas, if possible.			
5.6. Impact on indigenous vegetation, and on SSC and their habitats.	To reduce negative impacts on and loss of indigenous vegetation and protected trees. Minimise impacts on SSC and protected trees.	5.6.1. Appoint a specialist to undertake a third review and site visit of the final layout of the development footprint, in order to identify any plant species of SCC on site that may require "rescue" as well as any exotic weeds/vegetation that require removal.	▪ Appoint an Ecologist to oversee the final development footprint area through a reconnaissance survey.	▪ Prior to the commencement of construction.	▪ Project Owner, Specialist and ECO
		5.6.2. Identification of roadways and areas where extensive vegetation loss will result is required. Upon consideration, the avoidance of unnecessary clearance of vegetation on site should be undertaken through minor deviations to the design. 5.6.3. Ensure that the footprint required for the proposed project activities is kept at a minimum.	▪ Review how larger vegetation will be dealt with by contractors.	▪ Ongoing	▪ ECO and Project Owner
		5.6.4. Clearing of vegetation should be kept to a minimum, keeping the width and length of the earthworks to a minimum. 5.6.5. Confine clearance to footprint of development and demarcate all footprints clearly.	▪ Monitor activities and record and report non-compliance.	▪ Daily	▪ ECO and Contractor
		5.6.6. A walk-through prior to construction of the access roads, construction site, substation, turbines and crane pads to assess the presence of threatened SCC is proposed. 5.6.7. Location of footprint such that no threatened SCC are affected.	▪ Monitor activities and record and report non-compliance.	▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		5.6.8. Avoid the removal of listed SSC or protected species as far as possible. Should any of the listed/protected species need to be removed, the requisite permits must be obtained prior to the removal of the species.			
5.7. Disturbance of terrestrial fauna and flora on site due to construction workers and activities.	To advise construction staff of the requirements in respect of management of flora and fauna on site during the construction phase.	5.7.1. Conduct an Environmental Awareness Training and induction for all construction staff and personnel.	▪ Carry out Environmental Awareness Training with a discussion on the management of terrestrial fauna and flora on site. ▪ Conduct audits of the signed attendance registers.	▪ Prior to construction and as required by the ECO. Ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ ECO
5.8. Impact on fauna as a result of construction activities.	To identify any faunal mortalities and record the details (such as the reason, spatial extent etc.) in order to avoid repetition of fatality.	5.8.1. Establish a recording method in order to monitor the construction activities, including species presence within site, mortalities and sightings.	▪ Establish database of species, sightings etc. ▪ Construction personnel should advise on the findings and presence of fauna on site.	▪ Daily to monthly	▪ ECO
	To remove species that may be found present in the construction footprint and laydown area.	5.8.2. Appoint a specialist to conduct an inspection of the final project area and sweep or inspect the site for any fauna, once the fencing is complete (i.e. the established site should be flushed to ensure any large wildlife is not contained within the fenced area). Appoint a small team to flush game during the early evening. Game should be flushed by driving a team through the gated facility towards the exit.	▪ Team to flush game as required. ▪ ECO to monitor flushing process and record any incidents or non-compliance.	▪ Once off prior to commencement and thereafter if required.	▪ ECO and Project Owner
		5.8.3. The Contractor or Contractors Environmental Officer should monitor	▪ Monitor activities and record and report non-compliance.	▪ Daily and record as required	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		trenches at the start and end of each working day to check if any small animals are trapped.		during construction.	
		5.8.4. No animals (including snakes) shall be killed on site. An expert or a suitable specialist should be appointed to remove and relocate any poisonous snakes during the construction phase.	▪ Monitor activities and record and report non-compliance. ▪ Ensure that the ECO receive the appropriate snake handling training.	▪ As required during construction.	▪ ECO and Contractor
5.9. Impacts on birds due to the construction of the WEF.	Reduce impact on birds.	5.9.1. An extensive construction monitoring programme is recommended for this site in order to document any impacts and provide the basis for an adaptive management approach to any impacts. An avifaunal monitoring campaign is recommended for at least one year during the construction phase. 5.9.2. Appoint an avifaunal specialist to undertake the construction phase monitoring programme to assess disturbances occurring on site as well as the success of the mitigation measures. 5.9.3. Areas with large trees, as identified on site, should be retained as much as possible as they serve as potential roosting and breeding habitat for a variety of birds, including raptors. In instances where the removal of trees cannot be avoided, e.g. in the powerline servitude, the minimum number of trees should be removed in order to meet the legal and safety requirements. 5.9.4. A site specific avifaunal walk through should be conducted by a qualified ornithologist as part of the site specific	▪ Compile and implement a monitoring plan, and record any findings. ▪ If any such sites are found case specific mitigation measures will need to be designed. ▪ The monitoring plan must be conducted in accordance with the relevant Best Practice Guidelines at the time.	▪ Daily to monthly record keeping. ▪ An avifaunal monitoring campaign is recommended for at least one year during the construction phase	▪ Project Owner and ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		EMP just prior to construction, so as to ensure that no sensitive bird species have started breeding on or near site. 5.9.5. Internal 33 kV lines must be placed underground as far as possible, excluding sections where there may be geotechnical or other physical obstacles. The overhead 33 kV must utilise structures which have been approved as raptor friendly by the Endangered Wildlife Trust's Wildlife and Energy Programme.			
5.10. Faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site.	Minimise loss of fauna as a result of road mortalities.	5.10.1. The construction personnel and staff should be made aware of the presence of fauna within the proposed project area. The construction personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings.	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ ESO
		5.10.2. To ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the site camp must be kept clean on a daily basis.	▪ Monitor the activities via visual inspections, and record and report any non-compliance.	▪ Daily	▪ ESO and Contractor
5.11. Impact and loss of fauna as a result of the fence line and exclusion of fauna from site	To reduce incidental mortality and injury of fauna within the construction area.	5.11.1. Ensure that the live electrical fence wire is not placed at ground level.	▪ Conduct regular (daily) inspections of the fence line to address any animals that may be affected by the fence.	▪ Daily to monthly record keeping. A register of all faunal sightings indicating date	▪ Project Owner and Contractor ▪ ECO ▪ ESO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
resulting in ecological change within the site.				of siting; species affected; position of species (specific or indicative) and other observations should be established. ▪ Once-off prior to construction.	
5.12. Increased Electrical Light Pollution (ELP), leading to changes in nocturnal behavioural patterns amongst fauna.	The avoidance of electrical light pollution through prudent positioning of external lighting.	5.12.1. Placement of lighting, particularly security lighting (install downward lighting), to avoid excessive influence on surrounding areas. Placement of lighting to be judiciously considered at time of implementation.	▪ Review lighting plans and identify important habitat zones to be avoided.	▪ Prior to the installation of lighting.	▪ Project Owner, Contractor and ECO
C. OPERATIONAL PHASE					
5.13. Loss of SSC and their habitats.	Control loss of natural vegetation during the operational phase. Prevent impacts on natural vegetation in sensitive habitats and SSC.	5.13.1. Unnecessary impacts on surrounding natural vegetation must be avoided. All operational and maintenance vehicles to remain on the roads and no driving off road allowed. No unauthorized persons should be allowed onto the site.	▪ Strict control over the behaviour of operation workers, restricting activities to within demarcated areas for operation. Strict control and proper education of staff to prevent misconduct.	▪ Ongoing and as required	▪ Environmental Manager/ECO
		5.13.2. The collection, hunting or harvesting of any plants, any protected trees, fuel wood or animals at the site should be strictly forbidden and the staff	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction.	▪ Daily ▪ Once-off training and ensure all new	▪ Facility Manager and ESO ▪ ECO and ESO ▪ Facility Manager/ECO/ESO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		educated to prevent this from happening. 5.13.3. Educate personnel and staff members about the biodiversity importance of the area by means of environmental awareness programmes. 5.13.4. Staff must remain within the boundaries of the WEF at all times. The undeveloped portions of the site must be treated as conservation areas.	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. ▪ Issue fines for non-conformance as appropriate and as specified in the worker's contracts. ▪ Ensure that the awareness raising programmes are implemented.	staff are inducted. ▪ As required ▪ As required during the operational phase.	
		5.13.5. All hazardous materials should be stored in the appropriate manner to prevent impacts on vegetation. Any accidental chemical, 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.	▪ Monitor the activities via visual inspections, and record and report any non-compliance.	▪ Daily	▪ Environmental Manager/ECO/ESO and Facility Manager
		5.13.6. Fires should only be allowed within fire-safe demarcated areas. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the operational phase.	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas. ▪ Ensure fire safety requirements are well understood and respected by workers (by providing basic fire safety training).	▪ Daily	▪ Environmental Manger/ ▪ Facility Manager/ESO /ECO
		5.13.7. A storm-water management plan must be implemented during the operational phase. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	▪ Verify that the stormwater management plan is being implemented and signed off prior to the commencement of operations.	▪ Prior to commencement of operations. ▪ Weekly/Monthly	▪ Environmental Manager/ECO ▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Undertake regular inspections of the stormwater infrastructure (i.e. by implementing walk through inspections).		
		5.13.8. Undertake maintenance of rehabilitated areas in accordance with the rehabilitation and open space management plan.	▪ Monitor topsoil removal and rehabilitation activities, and record and report non-compliance.	▪ Weekly or Monthly	▪ Facility Manager and Environmental Manager/ECO
		5.13.9. Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species during the operation phase.	▪ Monitor the presence of alien invasive species on the development site.	▪ Reporting frequency depends on legal compliance framework	▪ Facility Manager and Environmental Manager/ECO
5.14. Impact and loss of fauna as a result of operational activities.	To reduce the loss of and impact on fauna.	5.14.1. Prior to the commencement of the operational phase, the facility manager and the landowner need to reach a decision in terms of the allowance of faunal activities or redress of faunal activities within site. 5.14.2. Identify points of excessive faunal activity and impact on operations. Undertake monitoring of faunal activities within the fenced area of the site and the immediate proximity of the site. 5.14.3. Reduction in speed limits in and around site. 5.14.4. No hunting or trapping of animals. 5.14.5. The operational phase EMP must include provision for application to the	▪ Establish reporting procedure. ▪ Monitor the presence of fauna during the operational phase via visual inspections and site visits. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. ▪ Issue fines for non-conformance as appropriate and as specified in the worker's contracts. ▪ Nest relocation or removal should be done under permit from the provincial authority.	▪ Daily ▪ Daily ▪ Once-off training and ensure all new staff are inducted. ▪ As required ▪ As required	▪ Facility Manager and Environmental Manager/ECO ▪ Facility Manager and Environmental Manager/ECO ▪ Facility Manager ▪ Environmental Manager/ECO ▪ Environmental Manager/ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		provincial authority for permits for any necessary nest management.			
5.15. Impact of ELP around the site.	The avoidance of electrical light pollution through prudent positioning of external lighting.	5.15.1. Placement of lighting, particularly security lighting to avoid excessive influence on surrounding areas.	▪ Review lighting plans and identify important habitat zones to be avoided.	▪ Prior to the installation of lighting.	▪ Project Owner and Environmental Manager/ECO
5.16. Faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site.	Minimise loss of fauna as a result of road mortalities.	5.16.1. The operational personnel and staff should be made aware of the presence of fauna within the proposed project area. The operational personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings.	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Facility Manager ▪ Environmental Manager/ECO
		5.16.2. To ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the offices must be kept clean on a daily basis.	▪ Monitor the activities via visual inspections, and record and report any non-compliance.	▪ Daily	▪ ECO and Contractor
D. DECOMMISSIONING PHASE					
5.17. Rehabilitation of flora on site.	Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.	5.17.1. All damaged areas shall be rehabilitated upon completion of the contract. 5.17.2. All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	▪ Conduct a final external audit to confirm that area is rehabilitated to an acceptable level.	▪ Once off	▪ Project Owner with feedback and input from an appropriate specialist.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		5.17.3. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.			

6 OPEN SPACE MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
6.1. Loss of vegetation and habitat fragmentation.	Keeping the area cleared of vegetation to a minimum.	6.1.1. Clearing of vegetation should be kept to a minimum and take into consideration the sensitivities on site shown in Appendices A and B of this EMPr.	▪ Ensure that no unnecessary areas are cleared of vegetation and that the project is constructed within its proposed footprint area.	▪ Once-off during design	▪ Project Owner
6.2. Impacts due to establishment of alien invasive plants.	Ensure the appropriate removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	6.2.1. Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. 6.2.2. Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site, if applicable. 6.2.3. Compile and finalise an alien weed eradication programme.	▪ Appoint a suitable specialist/ Contractor or contact the relevant authorities to seek guidance on the removal of the planted alien invasive species. ▪ Appoint a suitable specialist to compile an alien invasive vegetation eradication plan.	▪ Once-off during the design phase. ▪ Once-off during the design phase. ▪ Once-off during the design phase.	▪ Project Owner ▪ Project Owner ▪ ECO
6.3. Permanent barriers to animal movement and habitat fragmentation.	The reduction in the impact that barrier will have on animal movement within the area.	6.3.1. All remaining areas that are not impacted upon by the proposed development footprint should remain unfenced to allow for movement corridors between the remainder of the farm.	▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ Once-off during the planning and design phase	▪ Project Owner
B. CONSTRUCTION PHASE					
6.4. Permanent barriers to animal movement and habitat fragmentation.	The reduction in the impact that barrier will have on animal movement within the area.	6.4.1. Fencing should allow for the passage of small and medium sized mammals and all forms of mesh fencing should be avoided.	▪ This should be monitored by the ECO to determine whether this is effective.	▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
6.5. Loss of vegetation and habitat fragmentation.	Keeping the area cleared of vegetation to a minimum.	6.5.1. Clearing of vegetation should be kept to a minimum, keeping the width and length of the earthworks to a minimum.	▪ Monitor activities and record and report non-compliance.	▪ Daily	▪ ECO and Contractor
C. OPERATIONAL PHASE					
6.6. Increased risk of alien plant invasion.	Ensure that the site is kept free from alien invasive species or reduce existing presence of alien invasive species.	6.6.1. Continuously monitor the site and remove alien invasive species that are found.	▪ Monitor the presence of alien invasive species on the development site.	▪ Reporting frequency depends on legal compliance framework	▪ Facility Manager and Environmental Manager/ECO
6.7. Increased animal road mortality and mortality to birds and bats during the operation of the WEF,	Minimise loss of fauna as a result of road mortalities and operation of the WEF.	6.7.1. Create awareness during staff induction programmes. Staff must be made aware of the general speed limits as well as the potential animals that may cross and how to react in these situations.	▪ Conduct staff awareness training programmes.	▪ Once-off training and ensure all new staff are inducted.	▪ Facility Manager and Environmental Manager
		6.7.2. The relevant requirements and methodology for post construction bird and bat monitoring in terms of the applicable and most recent Best Practice Guideline at the time, e.g. “Birds/Bats and Wind Energy, Best Practice Guidelines” must be adhered to.	▪ Ensure that the relevant requirements for the post-construction bird monitoring in terms of the applicable Birds/Bats and Wind Energy Best Practice Guidelines are adhered to.	▪ As prescribed in the relevant Guidelines	▪ Project Owner
		6.7.3. Any avian mortality or injury at the facility should be duly recorded and reported.	▪ Record any bird and bat fatalities and undertake the necessary reporting to relevant authority.	▪ When required	▪ Project Owner
D. DECOMMISSIONING PHASE					
6.8. No specific impacts are associated with	To manage impacts on the surrounding environment	6.8.1. Disturbed and transformed areas should be contoured to approximate naturally occurring slopes to avoid lines	▪ Final external audit of area to confirm that area is rehabilitated to an acceptable level.	▪ Once off	▪ Project Owner

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area.	during the operational phase.	and forms that will contrast with the existing landscapes			
		6.8.2. Stockpiled topsoil should be reapplied to disturbed areas and these areas should be re-vegetated using a mix of native species in such a way that the areas will form as little contrast in form, line, colour and texture with the surrounding undisturbed landscape.	▪ Final external audit of area to confirm that area is rehabilitated to an acceptable level.	▪ Once off	▪ Project Owner
		6.8.3. Edges of re-vegetated areas should be feathered to reduce form and line contrasts with surrounding undisturbed landscape.	▪ Final external audit of area to confirm that area is rehabilitated to an acceptable level	▪ Once off	▪ Project Owner

7 TRAFFIC MANAGEMENT PLAN INCLUDING TRANSPORTATION PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
7.1. Increased traffic generation.	Manage impact that additional traffic generation will have on road network.	7.1.1. If abnormal loads need to be transported by road to the site, a permit needs to be obtained from the Provincial Government Northern Cape and the Western Cape Department of Public Works, Roads and Transport.	▪ Ensure that the permits are applied for and obtained prior to commencement. ▪ Verify that this has been undertaken by reviewing approved permits.	▪ Once-off during the design phase ▪ Once-off during the design phase.	▪ Contractor ▪ ECO
		7.1.2. Provide a Transport Traffic Plan to SANRAL (if required).	▪ Ensure that the plan is compiled and submitted prior to commencement. ▪ Verify that this has been undertaken by reviewing approved plans.	▪ Once-off during the design phase ▪ Once-off during the design phase.	▪ Contractor ▪ ECO
7.2. Accelerated degradation of road structure due to construction and operational traffic.	Limit the deterioration of the road condition due to construction and operational traffic.	7.2.1. A Road Maintenance Plan should be developed if necessary, including but not limited to, grading, dust suppressant mechanisms, drainage, signage, and speed limits.	▪ Ensure that the plan is compiled and submitted prior to commencement along with Final EMPr to DEA.	▪ Once-off during the design phase ▪ Once-off during the design phase.	▪ Contractor ▪ ECO
B. CONSTRUCTION PHASE					
7.3. Increased traffic generation during the construction phase resulting in a reduction of road based level of service	Reduce the amount of road based traffic during the construction phase.	7.3.1. Well maintained vehicles should be used together with well-trained drivers during the construction phase. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle	▪ Carry out random checks of driver licences and conduct random visual inspections of construction vehicles for roadworthiness.	▪ Random visual inspection of vehicles weekly.	▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. The Contractors must ensure that construction vehicles are roadworthy, properly serviced and maintained, and respect the vehicle safety standards implemented by the Project Owner.			
		7.3.2. During the construction phase, suitable parking areas should be designated for trucks and vehicles.	▪ Monitor the placement of the designated parking area for trucks and vehicles via visual inspections and record and report any non-compliance.	▪ Once-off prior to construction and as required during the construction phase.	▪ Project Owner and ECO
		7.3.3. The use of public transport (buses and/or minibus taxis) to convey construction personnel to the site should be encouraged If possible.	▪ Contractor may record arrival and departure times as well as number of workers using minibuses.	▪ Once a month on a randomly selected day.	▪ Contractor
		7.3.4. It is recommended that vehicles are not overloaded during the construction phase in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading. The inspections should also verify if the trucks are covered with appropriate material (such as tarpaulin) if and where possible.	▪ Perform visual inspection of vehicles during the construction phase.	▪ Random visual inspection of vehicles weekly.	▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
7.4. Increased level of road accidents (involving pedestrians, animals, other motorists on the surrounding tarred/ gravel road network) due to increased traffic during construction.	Minimise the impact of the construction activities on the local traffic and avoid accidents with pedestrians, animals and other drivers on the surrounding tarred/ gravel roads. Reduce number of road accidents due to increased traffic during construction.	7.4.1. Well maintained vehicles should be used together with well-trained drivers during the construction phase. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. The Contractors must ensure that construction vehicles are roadworthy, properly serviced and maintained, and respect the vehicle safety standards implemented by the Project Owner.	▪ Carry out random checks of driver licences and conduct random visual inspections of construction vehicles for roadworthiness.	▪ Random visual inspection of vehicles weekly.	▪ Contractor
		7.4.2. Road kill monitoring programme (inclusive of wildlife collisions record keeping) should be established	▪ Appropriate monitoring should be undertaken	▪ Weekly	▪ Contractor and ESO
		7.4.3. Adhere to all speed limits applicable to all roads used.	▪ Ensure that speed limits are adhered to. ▪ Carry out random visual inspections to verify speed limits and general awareness of vehicle drivers.	▪ Daily ▪ Random during the construction phase.	▪ Contractor and ECO ▪ ECO
7.5. Accelerated degradation of road structure due to construction traffic.	Limit the deterioration of the road condition due to construction traffic.	7.5.1. Construction activities will have a higher impact than the normal road activity and therefore the main access roads to site should be inspected on a weekly basis for structural damage.	▪ Ensure that the main access road to site maintains current condition through photographic surveys and monitoring.	▪ Weekly	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		7.5.2. It is recommended that vehicles are not overloaded during the construction phase in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading. The inspections should also verify if the trucks are covered with appropriate material (such as tarpaulin) if and where possible.	▪ Perform visual inspection of vehicles during the construction phase.	▪ Random visual inspection of vehicles weekly.	▪ Contractor
		7.5.3. Make provision for the repairing of subgrade deterioration (i.e. pot holes, dust holes) that could possibly result due to loading of heavy construction vehicles as required.	▪ Make provision for repairs required to road.	▪ Ongoing	▪ Contractor and ECO
7.6. Impact on air quality due to dust generation, noise and exhaust emissions from construction vehicles and equipment.	Limit the release of noise, pollutants and dust emissions	7.6.1. Implement management strategies for dust generation e.g. apply dust suppressant on the exposed areas and stockpiles as relevant.	▪ Ensure dust management measures are in place to adequately decrease the generation of dust.	▪ On-going	▪ Contractor and ECO
		7.6.2. Construction vehicles must have their lights on at all times. Lights to be properly set to not blind train drivers who may then miss important signal, e.g. stop signal (Signal Passed At Danger (SPAD).	▪ Ensure lights are on and properly set.	▪ On-going	▪ Contractor and ECO
		7.6.3. Postpone or reduce dust-generating activities during periods with strong wind. Earthworks may need to be rescheduled or the frequency of	▪ Ensure dust management measures are in place to decrease the dust generated.	▪ On-going	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		application of dust control/suppressant increased.			
		7.6.4. Avoid using old and unmaintained construction equipment (which generate high sound levels) and ensure equipment is well maintained.	▪ Manage the air pollutants from construction vehicles through checking the condition of vehicles .	▪ On-going	▪ Contractor and ECO
7.7. Soil contamination from leakage from hazardous materials (during transport and on-site construction).	Avoid soil contamination during transportation of goods to site.	7.7.1. The transport vehicle should be identified with symbols: the vehicle, must be correctly identified, following international conventions, symbols and colours, identifying the fact that corrosive and hazardous products are being transported.	▪ Check that trucks transporting that corrosive and hazardous materials to site are appropriately identified with the required symbols.	▪ On-going	▪ Contractor and ECO
		7.7.2. Personal Protective Equipment (PPE) should be provided for the transport team and they should be trained in the use of the equipment, in case of any accident.	▪ Provide PPE to transport team.	▪ On-going	▪ Contractor and ECO
C. OPERATIONAL PHASE					
7.8. Increased level of road accidents (involving pedestrians, animals, other motorists on the surrounding tarred/ gravel road network) due to increased traffic during the operational phase.	Minimise the impact of the operational activities on the local traffic and avoid accidents with pedestrians, animals and other drivers on the surrounding tarred/ gravel roads. Reduce number of road accidents due to increased traffic during the operational phase.	7.8.1. Well maintained vehicles should be used together with well-trained drivers during the operational phase, as required. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. Vehicles must be roadworthy, properly serviced and maintained.	▪ Carry out random checks of driver licences and conduct random visual inspections of vehicles for roadworthiness.	▪ Random visual inspection of vehicles weekly.	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		7.8.2. Adhere to all speed limits applicable to all roads used.	▪ Ensure that speed limits are adhered to. ▪ Carry out random visual inspections to verify speed limits and general awareness of vehicle drivers.	▪ Daily ▪ Random during the operational phase.	▪ Facility Manager ▪ Facility Manager
		7.8.3. The use of public transport (buses and/or minibus taxis) or carpooling to convey operational personnel to the site should be encouraged.	▪ Monitor the requirements	▪ On-going	▪ Facility Manager
		7.8.4. Adhere to requirements made within Transport Traffic Plan (to be developed prior to construction commencement).	▪ Monitor the requirements as set out in the Plan as ensure that it is adhered to	▪ On-going	▪ Facility Manager
		7.8.5. Limit access to the site to personnel and other authorized people.	▪ Maintain a register of visitors and staff that enter site and restrict access to personnel.	▪ On-going	▪ Facility Manager
7.9. Accelerated degradation of road structure due to operational traffic.	Limit the deterioration of the road condition due to operational phase traffic.	7.9.1. The main access roads to site should be inspected on a weekly basis for structural damage.	▪ Ensure that the main access road to site maintains current condition through photographic surveys and monitoring.	▪ Weekly	▪ Facility Manager
		7.9.2. Implement management strategies for dust generation e.g. apply dust suppressant to exposed areas and stockpiles, as relevant.	▪ Ensure dust management measures are in place to adequately decrease the generation of dust.	▪ On-going	▪ Facility Manager
		7.9.3. It is recommended that vehicles are not overloaded during the operational phase (where applicable) in order to reduce impacts on the road structures, particularly the access roads leading to the site.	▪ Perform visual inspection of vehicles during the construction phase.	▪ Random visual inspection of vehicles weekly.	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Random visual inspection of vehicles should be undertaken in order to monitor for overloading (where applicable).			
		7.9.4. Make provision for the repairing of subgrade deterioration (i.e. pot holes, dust holes) that could possibly result due to overloading of vehicles (where applicable).	▪ Make provision for repairs required to road.	▪ Ongoing	▪ Project Owner
		7.9.5. Implement requirements of the Road Maintenance Plan.	▪ Adhere to requirements of the Road Maintenance Plan.	▪ On-going	▪ Facility Manager
D. DECOMMISSIONING PHASE					
7.10. Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

8 STORM WATER MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
8.1. Impact of the project if a detailed storm water management plan is not correctly prepared and implemented.	To limit the effect of uncontrolled storm water run-off from developed areas onto natural areas.	8.1.1. Prepare a detailed stormwater management plan outlining appropriate treatment measures to address runoff from disturbed portions of the site, such that they do not: ▪ result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural water courses; ▪ result in any necessity for concrete or other lining of natural water courses to protect them from concentrated flows of the development; ▪ divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.	▪ Check compliance with specified conditions. ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ Once-off during design followed by regular control. ▪ During the design phase.	▪ Contractor ▪ ECO
B. CONSTRUCTION PHASE					
8.2. Diversion and impedance surface water flows – Changes to the hydrological regime and increased potential for erosion.	Prevent interference with natural run-off patterns, diverting flows and increasing the velocity of surface water flows.	8.2.1. The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	▪ Compile a Method Statement for Stormwater Management during the construction phase. ▪ Inspect and verify if a Method Statement for Stormwater Management has been compiled by the Contractor via	▪ Prior to the construction phase. ▪ Once-off prior to the commencement of the	▪ Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Diversion and increased velocity of surface water flows – reduction in permeable surfaces.			audits prior to the commencement of the construction phase.	construction phase.	
		8.2.2. Stormwater and any run-off generated by the hard surfaces should be discharged into retention swales or areas with rock rip-rap (or similar). These could be used to enhance the sense of place, if they are planted with indigenous vegetation.	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or bi-weekly	▪ ECO
		8.2.3. Erosion and sedimentation into water bodies must be minimised through the effective stabilisation (gabions and Reno mattresses or similar) and the re-vegetation of any disturbed riverbanks.	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or Bi-weekly	▪ ECO
		8.2.4. Place energy dissipation structures in a manner that allows the management of flows prior to being discharged into the natural environment, thus not only preventing erosion, but supporting the maintenance of natural base flows within these systems i.e. hydrological regime (water quantity and quality) is maintained.	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or bi-weekly	▪ ECO
		8.2.5. Reinforce soil slopes to minimise erosion during rehabilitation (as needed, and once construction in a specific area has been completed).	▪ Monitor activities and record and report non-compliance.	▪ As needed during the construction phase.	▪ ECO
		8.2.6. Any irrigation of the development area for landscaping or dust control purposes should be controlled, such that it does not result in any measurable increase in	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or bi-weekly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		moisture being passed into natural drainage lines.			
		8.2.7. Drainage along the sides of the roads should be designed so that it does not result in concentrated flows into watercourses.	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or bi-weekly	▪ ECO
		8.2.8. Perform periodic inspections and maintenance of soil erosion measures and stormwater control structures.	▪ Monitor activities and record and report non-compliance.	▪ As needed during the construction phase.	▪ ECO
8.3. Pollution of the surrounding environment as a result of the contamination of stormwater. Contamination could result from the spillage of chemicals, oils, fuels, sewage, solid waste, litter etc.	To prevent contaminated stormwater from entering into and adversely impacting on freshwater ecosystems and reducing the water quality. To reduce sedimentation of nearby water systems. To apply best practice principles in managing risks to storm water pollution.	8.3.1. The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	▪ Compile a Method Statement for Stormwater Management during the construction phase. ▪ Inspect and verify if a Method Statement for Stormwater Management has been compiled by the Contractor via audits prior to the commencement of the construction phase.	▪ Prior to the construction phase. ▪ Once-off prior to the commencement of the construction phase.	▪ Contractor ▪ ECO
		8.3.2. Provide secure storage for fuel, oil, chemicals and other waste materials to prevent contamination of stormwater runoff. Fuels and chemicals (i.e. any hazardous materials and dangerous goods) used during the construction phase must be stored safely on site and in bunded areas. Fuel and chemical storage containers must be inspected to ensure that any leaks are detected early.	▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents. Monitor if spillages have taken place and if they are removed correctly.	▪ Weekly	▪ ECO
		8.3.3. All stockpiles must be protected from erosion and stored on flat areas where run-off will be minimised. Erosion and sedimentation into water bodies must be	▪ Monitor the excavations and stockpiling process throughout the construction phase via	▪ Daily	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		minimised through effective stabilisation. No stockpiling should take place within a watercourse.	visual site inspections. Record non-compliance and incidents.		
		8.3.4. Littering and contamination of water resources during construction must be prevented by effective construction camp management. No surface, ground or storm water may be polluted as a result of any activities on the site.	▪ Monitor via site audits and record non-compliance and incidents (i.e. by implementing walk through inspections).	▪ Weekly	▪ Contractor and ECO
		8.3.5. Emergency plans must be in place to deal with potential spillages (especially those leading to any watercourses).	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or Bi-weekly	▪ ECO
		8.3.6. Erosion and sedimentation into water bodies must be minimised through the effective stabilisation (gabions and Reno mattresses or similar) and the re-vegetation of any disturbed riverbanks.	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or Bi-weekly	▪ ECO
		8.3.7. Ensure that the temporary site camp and ablution facilities are established at least 100 m away from the banks of drainage lines.	▪ Monitor the placement of the site camp via visual inspections, and record and report any non-compliance.	▪ Once-off prior to construction and as required during the construction phase.	▪ ECO
		8.3.8. Ensure that there is no ad-hoc crossing of channels by vehicles during the construction phase. Access routes across the site should be strictly demarcated and selected with a view to minimise impacts on drainage lines.	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or Bi-weekly	▪ ECO
		8.3.9. Ensure that no waste materials or sediments are left in the surrounding	▪ Check compliance with specified conditions of the	▪ Weekly or Bi-weekly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		drainage lines (as a result of the construction).	Stormwater Management Plan and Method Statement.		
		8.3.10. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	▪ Monitor via site audits and record non-compliance and incidents (i.e. by implementing walk through inspections).	▪ Weekly	▪ Contractor and ECO
C. OPERATIONAL PHASE					
8.4. Stormwater discharge into the surrounding environment during operations.	To minimise the contamination of stormwater by uncontrolled release of contaminated or grey water. To protect soil resources and prevent soil erosion.	8.4.1. An operational phase Stormwater Management Plan should be designed and implemented, with a view to prevent the passage of concentrated flows from hardened surfaces and onto natural areas.	▪ Compile a Stormwater Management Plan for the operational phase. ▪ Inspect and verify if a Stormwater Management Plan has been compiled prior to the commencement of the operational phase.	▪ Continuously during operational phase. ▪ Once-off prior to the commencement of the operational phase.	▪ Project Owner
		8.4.2. All release points into the natural environment must have appropriate energy dissipaters to minimise scouring/erosion.	▪ Monitor activities and record and report non-compliance. ▪ Monitor the placement of energy dissipaters via visual inspections, and record and report any non-compliance.	▪ On-going	▪ ECO
		8.4.3. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	▪ Undertake regular inspections of the stormwater infrastructure (i.e. by implementing walk through inspections).	▪ Weekly/Monthly	▪ ECO and O&M team
D. DECOMMISSIONING PHASE					
8.5. The proposed WEF would be expected to run for a minimum period of 20 years, after which it would either be decommissioned, alternatively upgraded or an application submitted to obtain a new license. Should the plant be decommissioned, the areas occupied by the wind turbines and associated infrastructure would be rehabilitated to its original (pre-development) state. In the (unlikely) event that none of the mitigation measures outlined for the construction and operational phases of the proposed project had been implemented, the period of time for recovery to take place would be extended. In the event that decommissioning occurs, and assuming implementation of mitigation measures, the hydrological regime should fully recover over time to present day conditions.					

9 EROSION MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. CONSTRUCTION PHASE					
9.1. Increased wind erosion and resultant deposition of dust.	Prevent wind erosion and resultant deposition of dust on surrounding indigenous vegetation.	9.1.1. Sand, stone and cement should be stored in demarcated areas, and covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation.	▪ Undertake regular inspections of the via site audits to verify that sand, stone and cement are stored and handled as instructed.	▪ Daily	▪ ECO and Contractor
		9.1.2. During construction, efforts should be made to retain as much natural vegetation as possible on the site, to reduce disturbed areas and maintain plant cover, thus reducing erosion risks.	▪ Monitor activities via site inspections and record and report non-compliance.	▪ Daily	▪ ECO and Contractor
		9.1.3. All stockpiles must be protected from erosion and stored on flat areas where run-off will be minimised. Erosion and sedimentation into water bodies must be minimised through effective stabilisation.	▪ Monitor the stockpiling process throughout the construction phase via visual site inspections. Record non-compliance and incidents.	▪ Daily	▪ ECO
9.2. Excessive loss of natural vegetation within the development footprint area.	Prevent loss of natural vegetation through erosion.	9.2.1. Vegetation clearing during construction must be restricted to the footprint of the proposed project components and planned infrastructure only. It should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.	▪ Monitor vegetation clearing throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible.	▪ Daily ▪ Daily	▪ ECO and Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		9.2.2. Stockpile the shallow topsoil layer separately from the subsoil layers (especially if the excavation exceeds 0.5 m). Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas.	▪ Rehabilitate disturbed areas and monitor the presence of alien invasive species on site.	▪ Daily (stockpiling) and once-off for the reinstatement of the top soil layer	▪ ECO and Contractor
		9.2.3. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	▪ Re-seed with seeds of indigenous grass species.	▪ Once off	▪ ECO with advice from specialist (if required)
		9.2.4. Topsoil stockpiles not used in three months after stripping must be seeded to prevent dust and erosion.	▪ Regular monitoring for erosion to ensure that no erosion problems are occurring at the site. All erosion problems observed should be rectified as soon as possible.	▪ Weekly initially and thereafter monthly	▪ ECO and Contractor
9.3. Erosion of surface soils, rilling and gulleys due to water erosion.	Measures to be implemented that address or avoid the loss of surface soils and exacerbates gulley formation.	9.3.1. Identify cause of erosion and possible means of redress (i.e. implement erosion control measures, where applicable), such as the use of geofabric, stone gabions and re-vegetation or similar measures. 9.3.2. Erosion control measures should seek to reduce surface flow velocity and allow for settlement on site of silt laden surface waters. Washaways, excessive loss of soils and gulleys can be considered to be indicative of excessive erosion.	▪ Monitor the erosion on site during construction, as well as the implementation and effectiveness of erosion control on site (such as the use of geofabric, stone gabions and re-vegetation or similar measures).	▪ Ongoing and as required during erosion events.	▪ ECO and Project Owner
B. OPERATIONAL PHASE					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
9.4. Excessive loss of natural vegetation in the development footprint area and resulting impacts on SSC, faunal habitat and habitat fragmentation.	Prevent loss of natural vegetation and minimise habitat fragmentation and the loss of connectivity as a result of erosion.	9.4.1. To prevent erosion, indigenous grasses that seed themselves should (where possible) be left to form a ground cover and kept short.	▪ ECO to advise on type seed to be used.	▪ Prior to re-vegetation.	▪ Project Owner
		9.4.2. The use of silt fences, sand bags or other suitable methods must be implemented in areas that are susceptible to erosion. Other erosion control measures that can be implemented are as follows: 1) Brush packing with cleared vegetation, 2) Planting of vegetation, 3) Hydro seeding/hand sowing. All erosion control mechanisms need to be regularly maintained.	▪ Monitor efficiency of erosion control measures.	▪ Weekly or monthly	▪ Project Owner
		9.4.3. Conduct regular monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. Ensure that all erosion problems are rectified as soon as possible.	▪ Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible.	▪ Monthly	▪ Project Owner
9.5. Increased water erosion as a result of run-off water from hardened surfaces.	Manage run-off water to prevent down slope water erosion.	9.5.1. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.	▪ Include periodic site inspections in environmental performance reporting that inspects the effectiveness and integrity of the run-off control system and specifically records occurrence or non-occurrence of any erosion on site or downstream. Corrective action must be implemented to the	▪ Monthly	▪ Project Owner

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			run-off control system in the event of any erosion occurring.		
C. DECOMMISSIONING PHASE					
9.6. No specific impacts are associated with the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. Monitoring: Final external audit of area to confirm that area is rehabilitated to an acceptable level (once off event to be conducted by ECO).					

10 HAZARDOUS SUBSTANCES LEAKAGE OR SPILLAGE MONITORING SYSTEM

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. CONSTRUCTION PHASE					
10.1. Contamination of soil and risk of damage to vegetation and/or fauna through spillage of concrete and cement.	To control concrete and cement batching activities in order to reduce spillages and resulting contamination of soil, groundwater and the vegetation and/or fauna.	10.1.1. If any concrete mixing takes placed on site, this must be carried out in a clearly marked, designated area at the site camp on an impermeable surface (such as on boards or plastic sheeting and/or within a bunded area with an impermeable surface).	▪ Monitor the handling and storage of sand, stone and cement as instructed.	▪ Daily	▪ Project Owner, Contractor, ESO and ECO
		10.1.2. Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains.	▪ Monitor the handling and storage of sand, stone and cement as instructed.	▪ Daily	▪ Project Owner, Contractor, ESO and ECO
		10.1.3. A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted.	▪ Monitor the handling and storage of sand, stone and cement as instructed.	▪ Daily	▪ Project Owner, Contractor, ESO and ECO
		10.1.4. Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licensed disposal facility. Proof of disposal (i.e. waste disposal slips or waybills) should be retained on file for auditing purposes.	▪ Monitor the handling and storage of sand, stone and cement as instructed. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Daily ▪ Monthly	▪ Project Owner, Contractor, ESO and ECO ▪ ECO
		10.1.5. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site. Empty cement	▪ Monitor the handling and storage of sand,	▪ Daily	▪ Project Owner, Contractor, ESO and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		bags must be collected from the construction area at the end of every day or in line with prevailing legislation for management of waste. Sand and aggregates containing cement must be kept damp to prevent the generation of dust.	stone and cement as instructed.		
		10.1.6. Any excess sand, stone and cement must be removed from site at the completion of the construction period and disposed at a licensed waste disposal facility. Proof of disposal (i.e. waste disposal slips or waybills) should be retained on file for auditing purposes.	▪ Monitor the handling and storage of sand, stone and cement as instructed. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Daily ▪ Monthly	▪ Project Owner, Contractor, ESO and ECO ▪ ECO
10.2. Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils.	To control and eliminate fuel and oil spillages which may result in soil contamination and damage to vegetation and/or fauna.	10.2.1. Ensure that adequate containment structures are provided for the temporary storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc.). Appropriate bund areas must be provided for the storage of these materials at the site camp. Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel).	▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	▪ Weekly	▪ Contractor and ECO ▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.2.2. Monitor and inspect construction equipment and vehicles to ensure that no fuel spillage takes place. Ensure that drip trays are provided for construction equipment and vehicles as required.	▪ Monitor the construction equipment and vehicles and monitor the occurrence of spills and the management process thereof. ▪ Record all spills and lessons learnt.	▪ Daily ▪ During spill events	▪ Contractor, ESO and ECO ▪ ECO
		10.2.3. Contractor to compile a Method Statement for refueling activities under normal and emergency situations. If on-site servicing and refueling is required in emergency situations, a designated area must be created at the construction site camp for this purpose. Drip trays or similar impervious materials must be used during these procedures.	▪ Verify if a Method Statement is compiled by reviewing approved and signed off reports. ▪ Monitor the refuelling/ servicing process and record the occurrence of any spillages.	▪ Once-off prior to commence-ment of construction. ▪ During emergency refuelling and servicing activities.	▪ Contractor and ECO ▪ ECO
		10.2.4. Spilled fuel, oil or grease must be retrieved and contaminated soil removed, cleaned and replaced.	▪ Monitor the handling and storage of fuels and oils via site audits and monitor if spillages have taken place and if so, are removed correctly. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Daily (or during spills)	▪ Contractor, ESO and ECO ▪ Environmental Manager
		10.2.5. Contaminated soil to be collected by the Contractor and disposed of at a registered	▪ Monitor the correct removal of	▪ Daily (or during spills)	▪ Contractor, ESO and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		waste facility designated for this purpose. Proof of disposal (i.e. waste disposal slips or waybills) should be retained on file for auditing purposes.	contaminated soil. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.		▪ Environmental Manager
		10.2.6. A Spill Response Method Statement must be compiled by the Contractor for the construction phase in order to manage potential spill events.	▪ Compile a Spill Response Method Statement. ▪ Audit signed and approved Spill Response Method Statement.	▪ Once-off (and thereafter updated as required during the construction phase). ▪ Once-off (and thereafter as required during the construction phase).	▪ Contractor and Project Owner ▪ ECO ▪ Environmental Manager
		10.2.7. The Contractor must ensure that adequate spill containment and clean-up equipment are provided on site for use during spill events.	▪ Monitor via site audits and record incidents and non-compliance.	▪ Daily/Weekly	▪ ECO and Contractor
		10.2.8. Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required.	▪ Ensure that a well-maintained portable bioremediation kit is available on site and that construction personnel and contractors are aware of its location and instructions	▪ Daily	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.2.9. In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree and level of contamination, excavation and removal to a hazardous waste disposal facility could be necessary. If the spillage is widespread and the soil is considered to be significantly contaminated, a specialist will need to be immediately appointed to address the spillage. This will usually entail the collection of samples of the contaminated soil followed by analysis in terms of the 2014 National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (i.e. GN 331). If the soil is determined to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant, including notifying the Minister of Environmental Affairs of the significant contamination. 10.2.10. Any event resulting in the spill or leak of chemicals or hazardous waste, as must be reported within 14 days to all relevant authorities, including the Western Cape Department of Environmental Affairs and Development Planning's (DEA&DPs) Department's Directorate: Pollution and Chemicals Management. Incident management includes the reporting, immediate containment, and remediation	▪ Ensure that a suitably qualified specialist is appointed to collect and analyse the contaminated soil samples in terms of the 2014 Norms and Standards (i.e. GN 331) in order to determine if the soil is significantly contaminated or not. ▪ If the contaminated soil is considered to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant. ▪ Report any spill or leak of chemicals or hazardous waste to the relevant authorities.	▪ During spill events. ▪ Spills or leaks of chemicals or hazardous waste must be reported to all relevant authorities within 14 days.	▪ Project Owner ▪ Environmental Manager ▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		of the affected area. All necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.			
		10.2.11. The Contractor must record and document all significant spill events.	▪ Monitor documentation and records of significant spill events via audits and record non-compliance and incidents.	▪ During spill events	▪ Contractor ▪ ECO ▪ Environmental Manager
B. OPERATIONAL PHASE					
10.3. Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils	To control and eliminate fuel and oil spillages which may result in soil contamination and damage to vegetation and/or fauna.	10.3.1. Monitor and inspect maintenance equipment and vehicles to ensure that no fuel spillage takes place.	▪ Implement specifications for maintenance equipment use as specified by the maintenance Contractor.	▪ Monthly	▪ Project Owner ▪ ECO
		10.3.2. Spilled fuel, oil or grease is retrieved during operations where possible and contaminated soil removed, cleaned and replaced.	▪ Monitor the handling and storage of fuels and oils via site audits and monitor if spillages have taken place and if so, are removed correctly. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ During spills	▪ Project Owner ▪ ECO
		10.3.3. Contaminated soil to be collected by the Contractor and disposed of at a registered waste facility designated for this purpose.	▪ Monitor the correct removal of contaminated soil.	▪ During spills	▪ Contractor Project Owner ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Proof of disposal (i.e. waste disposal slips or waybills) should be retained on file for auditing purposes.	Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.		▪ Environmental Manager
		10.3.4. A Spill Response Plan must be compiled for the operational phase in order to manage potential spill events.	▪ Compile a Spill Response Plan. ▪ Audit signed and approved Spill Response Method Statement.	▪ Once-off (and thereafter updated as required). ▪ Once-off (and thereafter as required).	▪ Project Owner ▪ Facility Manager
		10.3.5. Ensure that adequate spill containment and clean-up equipment are provided on site for use during spill events. Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required.	▪ Ensure that a well-maintained portable bioremediation kit is available on site and that operational personnel are aware of its location and instructions.	▪ Weekly	▪ Project Owner ▪ Facility Manager ▪ Environmental Manager
		10.3.6. In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree and level of contamination, excavation and removal to a hazardous waste disposal facility could be necessary. If the spillage is widespread and the soil is considered to be significantly contaminated, a specialist will need to be immediately appointed to address the spillage. This will usually entail the collection of samples of the contaminated soil followed by analysis in	▪ If the contaminated soil is considered to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant.	▪ During spill events	▪ Project Owner ▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		terms of the 2014 National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (i.e. GN 331). If the soil is determined to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant, including notifying the Minister of Environmental Affairs of the significant contamination. 331).			
		10.3.7. Ensure that adequate containment structures are provided for the temporary storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc.). Appropriate bund areas must be provided for the storage of these materials at the WEF. Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel).	▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	▪ Weekly	▪ Facility Manager ▪ ECO ▪ Environmental Manager
10.4. Impacts due to management of solid and liquid wastes disposed of on the site during operational phase.	Prevent environmental impacts as a result of the operational phase such as pollution.	10.4.1. All operation waste to be removed from the site by an appointed service provider.	▪ Waste removal and disposal to be monitored throughout operation.	▪ Monthly	▪ Facility Manager ▪ ECO
		10.4.2. All liquid waste or spills (used oil, paints, lubricating compounds and grease from vehicles passing through the entrance	▪ Monitor the correct removal of liquid waste or spills. Monitor waste disposal slips and	▪ During spills	▪ Project Owner ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		facility) to be packaged and disposed appropriately at a registered landfill site.	waybills via site audits and record non-compliance and incidents.		
		10.4.3. Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided in order to avoid spillages.	▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	▪ Monthly	▪ Facility Manager ▪ ECO ▪ Environmental Manager
C. DECOMMISSIONING PHASE					
10.5. No specific impacts are associated with the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area.					

11 ENVIRONMENTAL AWARENESS AND FIRE MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
11.1. Potential impacts resulting from the lack of overall compliance with the conditions of the EA (issued by the DEA)	Ensure compliance with all environmental conditions of approval (issued by DEA as part of the EA).	11.1.1. Establish clear and transparent reporting of the activities undertaken with regard to all recommendations included in the EMPr.	▪ Audit report on compliance with actions and monitoring requirements.	▪ Based on EA conditions	▪ Project Owner and ECO
11.2. Inappropriate planning and of site camp establishment.	Ensure that environmental issues are taken into consideration in the planning for site establishment.	11.2.1. All construction activities, materials, equipment and personnel must be restricted to the actual construction area specified (as required to undertake the construction work). The construction area must be demarcated by the Contractor.	▪ Monitor compliance and record non-compliance and incidents.	▪ Before construction	▪ Contractor ▪ ECO
		11.2.2. The Contractor should install and maintain Construction Site Information Boards in the position, quantity, design and dimensions specified by the Project Owner.	▪ Monitor compliance and record non-compliance and incidents.	▪ Before construction	▪ ECO
		11.2.3. General building materials should be stored in appropriate designated areas on site such that there will be no runoff from these areas towards sensitive systems. The site camp must be removed after construction.	▪ Monitor compliance and record non-compliance and incidents.	▪ During and after construction	▪ ECO
B. CONSTRUCTION PHASE					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
11.3. Potential risk of fire due to construction activities or behaviour of staff on site during the construction phase.	Prevent fire on site resulting from workers smoking or starting fires (i.e. cooking, heating purposes).	11.3.1. Designate smoking areas, as well as areas for cooking, where the fire hazard could be regarded as insignificant.	▪ Ad-hoc checks to ensure workers are smoking or cooking in designated areas only.	▪ Daily	▪ ECO and Contractor
		11.3.2. Educate workers on the dangers of open and/or unattended fires.	▪ Ensure fire safety requirements are well understood and respected by construction personnel. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Ongoing. ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ Contractor/ ECO ▪ ECO
		11.3.3. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the construction phase.	▪ Ensure fire safety requirements are well understood and respected by construction personnel. Provide basic fire safety training.	▪ On-going	▪ ECO and Contractor
		11.3.4. Ensure that cooking takes place in a designated area shown on the site map. Ensure that no firewood or kindling may be gathered from the site or surrounds.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.3.5. Fire-fighting equipment must be made available at various appropriate locations on the construction site.	▪ Ensure fire safety requirements are well understood and respected by workers. ▪ Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company.	▪ On-going ▪ Bi-annually	▪ ECO and Contractor ▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
11.4. Inappropriate behaviour of contractors and sub-contractors during the construction phase	Prevent unnecessary impacts on the surrounding environment by ensuring that contractors are aware of the requirements of the EMPr. Ensure that contractors and sub-contractors do not induce impacts on the surrounding environment as a result of unplanned pollution on site. Ensure that actions by on-site contractors and sub-contractors and workers are properly managed in order to minimise impacts to surrounding environment	11.4.1. Ensure that the EMPr and the EA (should it be granted by the DEA), are included in all tender documentation and contractors and sub-contractors contracts.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.4.2. Contractors and sub-contractors must use the ablution facilities situated in a designated area within the site; and no bathing/washing should be permitted outside the designated area.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.4.3. All litter will be deposited in a clearly labelled, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.4.4. No person other than a qualified specialist or personnel authorised by the Project Owner, will disturb or remove plants outside the demarcated construction area.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.4.5. No person other than a qualified specialist or personnel authorised by the Project Owner, will disturb animals on the site.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.4.6. Educate workers on site about suitable behaviour on site and initiate environmental awareness. Staff must be informed that no trapping, snaring or feeding of any animal will be allowed.	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Contractor/ ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
11.5. Increased energy consumption during the construction phase.	Reduce energy consumption where possible.	11.5.1. Encourage the use of energy saving equipment at the site camp site (such as low voltage lights and low pressure taps) and promote recycling. Construction personnel must be made aware of energy conservation practices as part of the Environmental Awareness Training programme.	▪ Contractor to monitor energy usage via audits. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Monthly ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Contractor ▪ Contractor/ ECO ▪ ECO
11.6. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during the construction phase.	11.6.1. Water conservation should be practiced as follows: ▪ Cleaning methods utilised for cleaning vehicles, floors, etc. should aim to minimise water use (e.g. sweep before wash-down). ▪ Ensure that regular audits of water systems are conducted to identify possible water leakages. 11.6.2. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible.	▪ Monitor via site audits and record non-compliance and incidents.	▪ Monthly	▪ ECO
		11.6.3. Make construction personnel aware of the importance of limiting water wastage, as well as reducing water use.	▪ Carry out Environmental Awareness Training with a discussion on water usage and conservation. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Contractor/ ECO ▪ ECO
C. OPERATIONAL PHASE					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
11.7. Potential risk of fire due to behaviour of staff on site during the operational phase	Ensure appropriate and efficient fire prevention during the operational phase.	11.7.1. Designate smoking areas as well as areas for cooking, where the fire hazard could be regarded as insignificant.	▪ Random inspections during a month to ensure workers are smoking or starting fires in designated areas only.	▪ Monthly	▪ Facility Manager
		11.7.2. Educate workers on the dangers of open and/or unattended fires.	▪ Ensure fire safety requirements are well understood and respected by operational personnel. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Ongoing ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Facility Manager ▪ Facility Manager ▪ Facility Manager
		11.7.3. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the operational phase.	▪ Ensure fire safety requirements are well understood and respected by operational personnel. Provide basic fire safety training.	▪ On-going	▪ Project Owner ▪ Facility Manager ▪ Environmen-tal Manager
		11.7.4. Ensure that adequate fire-fighting equipment is available and easily accessible on site.	▪ Ensure fire safety requirements are well understood and respected by workers. ▪ Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company.	▪ On-going ▪ Bi-annually	▪ Facility Manager ▪ Project Owner ▪ ECO ▪ Environmen-tal Manager
11.8. Increased energy consumption during the operational phase.	Reduce energy consumption where possible.	11.8.1. Encourage the use of energy saving equipment at the WEF (such as low voltage lights and low pressure taps) and promote recycling. Operational personnel must be made aware of	▪ Monitor energy usage via site investigations. ▪ Conduct training for all operational personnel.	▪ Monthly ▪ As and when required and ensure that all	▪ Facility Manager ▪ Project Owner

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		energy conservation practices as part of the environmental awareness training programme.		new staff are inducted.	
11.9. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during operations.	11.9.1. Water conservation to be practiced in line with Energy Saving Policies as follows: ▪ Cleaning methods utilised for cleaning vehicles, floors, the offices etc. should aim to minimise water use (e.g. sweep before wash-down). ▪ Where possible, encourage the re-use of water. ▪ Ensure that regular audits of water systems are conducted to identify possible water leakages. ▪ Consider installing water saving devices (e.g. dual flush toilets, automatic shut-off taps, etc.).	▪ Record water usage during the operational phase, conduct audits and record non-compliance and incidents.	▪ Monthly	▪ Facility Manager
		11.9.2. Carry out environmental awareness training with a discussion on water usage and conservation, and make operational personnel aware of the importance of limiting water wastage.	▪ Conduct training for all operational personnel.	▪ As and when required during operations and ensure that all new staff are inducted.	▪ Facility Manager
11.10. Disregard of waste management practices	Minimise the production of general waste. Ensure compliance with relevant waste management legislation.	11.10.1. Control and implement waste management plans. Ensure that relevant legislative requirements are respected. 11.10.2. Determine specific areas on site for temporary management of waste.	▪ Control of waste management practices throughout operation phase.	▪ Monthly	▪ Project Owner ▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
	Minimise pollution of the environment.	11.10.3. Promote waste reduction, re-use, and recycling opportunities on site during the operation phase. 11.10.4. Ensure an adequate and sustainable use of resources.	▪ Monitor waste generation and collection throughout operation.	▪ Monthly	▪ Facility Manager
11.11. Excessive generation of waste water on site during the operation phase	Maintain reasonable levels of waste water generation	11.11.1. Waste water must be collected and disposed of at a suitable licenced disposal facility. Proof of disposal (i.e. waste disposal slips or waybills) should be retained on file for auditing purposes.	▪ Waste water generation to be monitored throughout the operational phase. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Quarterly	▪ Facility Manager
D. DECOMMISSIONING PHASE					
11.12. Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

12 AVIFAUNAL MANAGEMENT PLAN (BIRDS AND BATS)

An Avifaunal Management Plan will be prepared by suitably qualified bird and bat specialists based on the current bird and bat best practice guidelines at that time.

1. BIRDS

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
A. CONSTRUCTION PHASE					
12.1. Mortality of Red Data avifauna (birds) due to disturbance during construction phase	Prevent Mortality of Red Data avifauna due to construction activities.	12.1.1. Develop and implement a Construction EMP (CEMP) (minimum one year) to assess disturbances occurring on site. 12.1.2. CEMP to be done in accordance with the relevant Best Practice Guidelines at the time. 12.1.3. Existing roads and farm tracks should be used where possible; 12.1.4. The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths; 12.1.5. Sensitive zones and no-go areas (e.g. nesting areas) are to be avoided as indicated in the Bird Impact Assessment (Appendix D); 12.1.6. No off-road driving; 12.1.7. ECO to oversee activities and ensure that the CEMP is implemented and enforced; 12.1.8. Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final road	▪ Appoint a suitably qualified avifaunal specialist. ▪ Monitor the efficiency of the CEMP and revise if necessary. ▪ Site visits and monitoring to ensure that the recommendations are adhered to. ▪ Training to be provided to the ECO and Facility manager to identify Red Data and priority bird species, as well as their nests. ▪ Rehabilitation specialist should be appointed and the effectiveness of rehabilitation to be monitored post construction. ▪ Relevant Best Practice Guidelines to be implemented during the construction phase. ▪ Attach bird flight diverters to overhead power lines and	▪ Once-off before construction commences. ▪ CEMP to be implemented for a minimum of a year during the construction phase. ▪ Daily site visits. ▪ Training to be provided before construction commences. ▪ During the construction phase.	▪ Avifaunal specialist and Project Developer ▪ ECO ▪ ECO and contractor ▪ Project Developer and avifaunal specialist.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
		and power line routes as well as the final turbine positions, to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded; 12.1.9. The construction Phase ECO, the contractor, the Facility Manager and the onsite Environmental Manager, and are to be trained to identify Red Data and priority bird species, as well as their nests. If any nests or breeding locations for this species are located, the avifaunal specialist is to be contacted for further instruction; 12.1.10. Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the CEMP. 12.1.11. Power lines should cross very high sensitive areas as little as possible, but should mainly aim to not be orientated perpendicularly to known flight bird paths. Instead, to reduce the risk of collision, the orientation should rather be parallel to these flight paths. This should be further assessed for approval by the avifaunal	weather mast guyed wires, to increase the visibility of these structures to low flying birds. ▪ Power lines should never run perpendicularly to known flight paths. They should only be orientated parallel to these flight paths – to avoid an increased risk of collision. ▪ To prevent collisions of small passerine species and low-flying birds, the lowest blade tip should not be lower than 40m. ▪ To ascertain that the overhead power lines are relatively safe for the bird community, they should be signed off as being "bird-friendly" by the avifaunal specialist, prior to construction.		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
		specialist as soon as the power line layout becomes available (to be subject of a separate basic assessment report). 12.1.12. The overhead 33 kV must be signed off as "bird-friendly" by an avifaunal specialist prior to construction.			
B. OPERATIONAL PHASE					
12.2. Mortality of Red Data avifauna due to collision with wind turbines	Prevent Mortality of Red Data avifauna due to collision with wind turbines.	12.2.1. Develop an operational monitoring programme based on Best Practice Guidelines at the time. 12.2.2. This plan should include a carcass search programme for birds during the first two years of projects operation, 12.2.3. Operational monitoring in line with applicable guidelines. Then again in the fifth year, and every five years thereafter. It is only necessary to conduct the relevant carcass searches and trials after the completion of the second operational year. 12.2.4. Further operational mitigation measures to be researched, by appointed bird specialist, and the appropriate selected mitigation implemented, if post construction monitoring reveal high levels of impacts. 12.2.5. If post-construction monitoring reveals significant unexpected impacts on birds that requires	▪ Implement and monitor the efficiency of the programme based on the relevant Best Practice Guidelines at the time. Revise the programme based on operational monitoring data and results as required (but should still be in line with the current Guidelines). ▪ Appoint an avifaunal specialist. ▪ Monitor compliance with recommendations. ▪ Implement an avifaunal monitoring programme in line with the most recent version of the Best Practice Guidelines that will be available at the time. ▪ Further operational mitigation measures to be researched	▪ A monitoring programme (including carcass searches and bias/scavenger trials) is recommended for a minimum of two years during the operational phase ▪ During the first two years of the projects' operational phase. Then in the fifth year, and every five years thereafter. ▪ During the operational phase of the project. ▪ During the operational phase of the project.	▪ Avifaunal specialist and Project Owner. ▪ Facility Manager ▪ The holder of the EA, the DEA and Birdlife.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
		additional mitigation measures to be implemented then these mitigation measures will be determined and agreed upon between the holder of the EA, the DEA and Birdlife.	during the operational monitoring campaign as an adaptive management approach. If significant levels of fatalities are observed in the opinion of the avifauna specialist, then these measures should be implemented. Such measures could include (but not limited to) shut-down on demand technology, habitat management, or bird deterrence systems. Regardless, according to IFC (2012) and BBOP (2012), if mitigation strategies are required, then all stakeholders (including, but not limited to: Birdlife South Africa, DEA, developer, landowners etc.) are to be consulted accordingly, in order to make decisions on thresholds and the types of mitigation measures. Additionally, as soon as these issues are identified, the mitigation strategies should be written into the EMPr for the		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
			developer to comply with, irrespective of cost. ▪ Further mitigation measures to be determined and implemented if post-construction monitoring reveals significant unexpected impacts on birds.		

2. BATS

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
A. CONSTRUCTION PHASE					
12.3. Mortality of Red Data avifauna (bats) due to disturbance during construction phase.	Prevent Mortality of Red Data avifauna due to construction activities.	12.3.1. A site-specific CEMP must be created, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of bat habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction. 12.3.2. It is recommended that a bat specialist surveys the confirmed turbine locations and the locations of all other site infrastructure, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats before any construction activities commence and once the preliminary design and layout of the site is complete. 12.3.3. A buffer of 200 m must be maintained around potentially important bat features such as along water lines and associated riverine vegetation. It is recommended that should any new infrastructure (including roads and electrical infrastructure) cross these features, then they should not be routed to run parallel with them, but rather cross them perpendicularly, as	▪ Appoint a suitably qualified bat specialist. ▪ Monitor the efficiency of the CEMP and revise if necessary. ▪ Site visits and monitoring to ensure that the recommendations are adhered to. ▪ Training to be provided to the ECO, Contractor and Facility manager to identify Red Data and priority bat species, as well as their nests. ▪ Rehabilitation specialist should be appointed and the effectiveness of rehabilitation to be monitored post construction. ▪ Relevant Best Practice Guidelines to be implemented during the construction phase. ▪ Buffers to avoid bat sensitive areas to be adhered to.	▪ Once-off before construction commences. ▪ CEMP to be implemented for a minimum of a year during the construction phase. ▪ Daily site visits. ▪ Training to be provided before construction commences.	▪ Bat specialist and Project Developer ▪ ECO ▪ ECO and contractor ▪ Project Developer and Bat specialist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	*Frequency*	*Responsibility*
		far as possible. This does not apply to use of existing roads. No wind 12.3.4. No construction activities with the potential to physically affect any bat roosts will be permitted without the express permission of a suitably qualified bat specialist following appropriate investigation and mitigation. 12.3.5. Four roosts are confirmed on the Kudusberg WEF site. These should be buffered by 500 m as recommended in the Bat Impact Assessment (Appendix D of the BAR). This is according to the current South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction: 4th Edition. South African Bat Assessment Association. However, the applicable Best Practice Guidelines at the time of construction and operation should be implemented. 12.3.6. Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the CEMP.			
B. OPERATIONAL PHASE					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
12.4. Mortality of bats due to collision with wind turbines and barotrauma during project operations.	Prevent mortality of bats due to collision with wind turbines and barotrauma.	12.4.1. Develop an operational bat monitoring programme based on Best Practice Guidelines at the time. 12.4.2. Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice guidelines at the time to monitor mortality and bat activity levels. Acoustic monitoring should include monitoring at height (from more than one location) and at ground level. 12.4.3. Conduct a monitoring campaign (with carcass searches, searcher efficiency trials and scavenger removal trials) during the first two years of the projects' operational phase. Further monitoring can, however, be recommended during later stages – if deemed relevant by the bat specialist 12.4.4. If mortality does occur, the level of mortality should be considered by a bat specialist to determine if this is at a level where further mitigation needs to be considered. 12.4.5. It is advised that both pre-construction and operational monitoring data are used to confirm the need for additional mitigation measures. 12.4.6. Bats must be prevented from entering any possible artificial roost structures (e.g. roofs of buildings,	▪ Implement an operational bat monitoring progamme and monitor the efficiency of the programme based on the relevant Best Practice Guidelines at the time. ▪ Appoint a bat specialist. ▪ Revise the programme based on operational monitoring data and results as required (but should still be in line with the current Guidelines) and based on recommendations from a bat specialist ▪ Monitor compliance with recommendations and implement the required buffers.	▪ Monitoring programme to be implemented as required by the relevant guidelines at the time and as prescribed in the carcass search programme. ▪ Monitoring programme to be conducted during the first two years of the operational phase. ▪ Further monitoring can be recommended at a later stage based on the level of mortality and recommendation from the bat specialist.	▪ Avifaunal specialist and Project Developer. ▪ ECO ▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	*Frequency*	*Responsibility*
		road culverts and wind turbines) by ensuring that they are sealed in such a way as to prevent bats from entering. If bats colonise WEF infrastructure, a suitably qualified bat specialist should be consulted before any work is undertaken on that infrastructure and before attempting to remove any bats. Ongoing maintenance and inspections of buildings must be carried out to ensure no access to bats. 12.4.7. Where lights need to be used, these should have low attractiveness for insects such as low pressure sodium and warm white LED lights (Rydell 1992; Stone 2012). High pressure sodium and white mercury lighting is attractive to insects (Blake et al. 1994; Rydell 1992; Svensson and Rydell 1998) and should not be used as far as possible. Variable lighting regimes, reducing light spillage and using lower intensity lighting will be favourable. Additional considerations and mitigation options are provided in Stone (2012). All lights should however be in line with the requirements of the CAA.			

13 HERITAGE AND PALAEONTOLOGICAL MATERIAL MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
PLANNING PHASE: HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
13.1. Impacts to archaeology, graves and palaeontological material.	Achieve a layout that minimizes the potential impacts to archaeological resources, graves and/or palaeontological material.	13.1.1. Ensure that project layout avoids as many known archaeological resources, graves and/or palaeontological material as possible, in close proximity to the proposed development footprint. 13.1.2. The ECO should be trained by a specialist palaeontologist for the identification of potential for fossils to be uncovered during excavations. As many excavations as possible should be monitored by the ECO during construction and if any fossils are uncovered they should be protected *in situ* and immediately reported to a palaeontologist in order to plan a way forward. 13.1.3. These no-go sites should be examined periodically by the ECO during the construction phase to ensure that they are being respected and secure and fenced off during the construction phase.	▪ Take cognizance of the archaeological sites reported in the Heritage Impact Assessment (HIA) when designing facility layout and routing. ▪ Appoint a professional archaeologist to carry out a pre-construction walk down survey. ▪ Ensure and verify that the significant palaeontological and archaeological sites identified in the HIA are included on project maps and regarded as no-go zones with buffers during the planning and design phase. Review the site layout plan, and signed minutes of meetings or signed reports.	▪ Once-off (at least 6 months in advance of construction) ▪ Once-off ▪ On-going	▪ Project Developer ▪ Heritage specialist ▪ ECO
13.2. Impacts to the natural and cultural landscape.	Reduce the degree of visual contrast in the landscape.	13.2.1. Plan to use an earth-coloured paint on the built elements of the facility.	▪ Include earth-coloured paint in the design specifications for the facility.	▪ Once-off	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
CONSTRUCTION PHASE: HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
13.3. Clearing of vegetation and excavation of foundations	Avoid or minimize the destruction or disturbance of archaeological materials.	13.3.1. Ensure that project layout avoids as many known archaeological resources, graves and/or palaeontological material as possible, in close proximity to the proposed development footprint. Apply the following buffers: • Graves: no development should be permitted within 50 m of identified graves and cemeteries; existing roads within this buffer should not be altered or widened; • Cave site (KDB045): construction staff should not be permitted within 200 m of the site; • Farmsteads: no turbines should be located within 500 m of farmsteads; and • Kraals, stone walling and ruins > 100 years: construction staff should not be permitted within 100 m of these sites and no development should occur within 15m of these sites. 13.3.2. Ensure and verify that the archaeological sites identified in the HIA are included on project maps and regarded as no-go zones with buffers during the planning and design phase. 13.3.3. Appoint a professional archaeologist to carry out a pre-construction walk down survey.	▪ Appoint an archaeologist to conduct a walk-down survey of the final approved layout before construction. ▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities in demarcated no-go areas.	▪ Once off before construction commences. ▪ Weekly	▪ Heritage specialist ▪ Project Owner ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
13.4. Construction vehicles and activities could result in damage to or destruction of archaeological sites, graves, and/or paleontological resources.	Minimize the chances of significant archaeological sites and/or graves being disturbed.	13.4.1. A walk-down survey of the final approved layout will need to be conducted prior to construction. Any sites found during this survey and that require mitigation would need to be mitigated well in advance (at least six months) of the commencement of construction in order to allow time in case there are further requirements that need to be met (for example radiocarbon dating or further work on any sites that revealed even more significant material than was evident from the surface). 13.4.2. Ensure that no activity takes place outside of the authorized construction footprint. 13.4.3. The revised layout 1 adheres to the recommended buffers and is the preferred option. 13.4.4. All site crew should be informed of the heritage significance of the resources in the study area, and those sites near the development infrastructure, or easily reached should be inspected by the ECO during the construction phase to ensure they are being respected; 13.4.5. New construction work, construction camps, substations or access roads should not impact negatively or threaten any of the historic built form.	▪ Conduct a walk-down survey of the final approved layout before construction. ▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas.	▪ Once off before construction commences. ▪ Weekly	▪ Heritage specialist ▪ ECO
		13.4.6. The Contractor and ECO must be informed of the possibility of any	▪ Carry out Environmental Awareness Training to ensure	▪ Once-off training and	▪ Contractor/ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		heritage material (i.e. ensure that all personnel are aware of the potential of encountering graves and what to do if this occurs (i.e. to report any suspicious stone features prior to disturbance)). 13.4.7. Alternatively commission an archaeologist to examine the final development footprint at least six months prior to the commencement of construction.	▪ that the Contractors are informed of the possible type of heritage features that may be encountered during the construction phase. ▪ Conduct audits of the signed attendance registers. ▪ Carry out visual inspections to ensure that no-go areas such as graves be avoided during the construction phase. ▪ Appoint a professional archaeologist to examine the construction footprint. ▪ Conduct an audit to verify that the necessary permits are obtained by the archaeologist, if required.	▪ ensure that all new staff are inducted. ▪ Monthly ▪ Once-off six months prior to construction. ▪ As required/ necessary during the construction phase.	▪ ECO ▪ Archaeologist ▪ Project Owner
		13.4.8. The buffer areas listed above should be cordoned off in advance of the development commencing (the mitigation archaeologist could be called on to assist with this if needed).	▪ Ensure archaeological sites are cordoned off. ▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas and outside of the buffer areas to ensure that the cordoned off areas remain free of disturbance.	▪ Once off before construction commences ▪ Weekly	▪ ECO/Archaeologist
		13.4.9. If any of the graves or potential graves found on site cannot be avoided, then an archaeologist should be contracted to conduct a test	▪ Appoint a professional archaeologist to conduct a test excavation to determine if the sites are graves.	▪ As potential graves are encountered	▪ Project Owner

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		excavation to determine the status of the feature. If it is determined to be a grave, then exhumation would need to occur (if necessary) with the permission of SAHRA (and in accordance with any requirements that SAHRA might impose at the time).	▪ Conduct an audit to verify that the necessary permits are obtained by the archaeologist for the test excavation, if required.		
		13.4.10. If any concentrations of archaeological material, graves or stone features are uncovered during the proposed construction, work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution. Sufficient time should be allowed to remove/collect such material. A Chance Find Procedure (see Appendix 13.A) must be followed if fossils are uncovered in the areas marked as High and Medium Palaeontological Sensitivity during the construction phase. 13.4.11. New construction work, construction camps, substations or access roads should not impact negatively or threaten any of the historic built form, which is part of the history and land use evolution of the cultural	▪ Monitor excavations and construction activities for archaeological materials via visual inspections and report the finds accordingly. ▪ Implement a Chance Find Procedure ▪ Contact the relevant heritage authorities and the identified archaeologist if any heritage features are uncovered.	▪ Daily or during excavations. ▪ During the construction phase ▪ As required/ necessary during the construction phase.	▪ Contractor and ECO ▪ Contractor and ECO ▪ Project Owner

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		landscape. To achieve this, a reasonable distance should be kept from all historic built features on the landscape, as has been addressed by the revised layout proposal. 13.4.12. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Should sites or finds be located in the Western Cape, Heritage Western Cape needs to be informed immediately.			
13.5. Impacts to the cultural landscape and disruption of traditional activities	Reduce visual contrast of the development in the landscape. Reduce visual intrusion into cultural landscape & disruption of traditional activities.	13.5.1. Minimize surface footprint and the amount of white structures visible. 13.5.2. Roads must be designed in such a way as to minimise cut and fill operations in order to reduce landscape scarring. 13.5.3. Minimise fencing in communal lands that is used for traditional practices such as herding and the collection of natural products.	▪ Monitor the paint colour via visual inspections and report non-compliance.	▪ Once-off, at an appropriate time during construction period.	▪ Project developer ▪ Contractor ▪ ECO
CONSTRUCTION PHASE: PALAEONTOLOGICAL HERITAGE IMPACTS					
13.6. Loss of palaeontological heritage resources at or beneath ground surface within the development footprint (fossils, fossil sites and contextual geological data).	Reporting, conservation, recording and judicious sampling of scientifically important fossil material exposed during the construction phase of development.	13.6.1. Reporting chance fossil finds to SAHRA or Heritage Western Cape for possible professional mitigation. Such finds are more likely to be made on the low lands than on the mountains 13.6.2. Pending the potential discovery of significant new fossil remains during the construction phase - in which event the Chance Fossil Finds Protocol should be applied (Appendix 13.A) below)	▪ Monitoring of all substantial excavations into sedimentary bedrocks for fossil material (e.g. vertebrate bones & teeth, fossilized wood, shells) ▪ Safeguarding of chance fossil finds, preferably *in situ*. ▪ Report chance finds to SAHRA	▪ Throughout the construction phase.	▪ ESO
		13.6.3. Recording and sampling of fossil material and associated geological data (only necessary for chance fossil finds made during the proposed development).	▪ Application by a qualified palaeontologist for fossil collection permit from SAHRA. ▪ Palaeontologist to undertake field study of fossil finds *in situ* on site. Photography and sampling of important finds. ▪ Curation of fossils collected in an approved repository	▪ Following alert of chance fossil finds on site (It is important to note that there is no need for on-site palaeontological monitoring	▪ Qualified palaeontologist appointed and commissioned by the Project Owner.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			(museum/ university collection).	unless new fossil finds are made during development).	
OPERATION PHASE: HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
13.7. Potential impact of WEF on the cultural landscape and disruption of traditional activities	Reduce visual contrast of the development in the landscape. Reduce visual intrusion into cultural landscape & disruption of traditional activities.	13.7.1. Monitor building and façade maintenance. Painted features should be maintained and repainted when colour fades or paint flakes. 13.7.2. Good house-keeping in terms of management of facility	▪ Carry out an inspection of WEF to ensure that it is being maintained in a good condition. ▪ Monitor the paint colour to detect fading.	▪ Monthly ▪ Annually	▪ Project Owner ▪ Facility Manager
13.8. Maintenance vehicles and activities could result in damage to or destruction of archaeological sites and/or graves.	Minimise the chances of significant archaeological sites and/or graves being disturbed.	13.8.1. Ensure that no activity takes place outside of the authorized operational footprint.	▪ Carry out visual inspections to ensure strict control over the behaviour of operational staff to ensure that activities do not take place outside of authorized operational footprint.	▪ Weekly	▪ Facility Manager ▪ ESO and ECO
DECOMMISSIONING PHASE: HERITAGE IMPACTS (ARCHAEOLOGY, PALAEONTOLOGY AND CULTURAL LANDSCAPE)					
13.9. Vehicles and activities associated with the removal of the WEF and rehabilitation of site could result in damage to or destruction of archaeological sites and/or graves.	Avoid or minimise the chances of significant archaeological sites and/or graves being disturbed.	13.9.1. Ensure that no activity takes place outside of the authorized construction footprint. 13.9.2. Report any chance finds of fossils or palaeontological resources and graves to the relevant Heritage Authorities. 13.9.3. Ensure excavation and sampling of affected archaeological sites. 13.9.4. Graveyards on site must be cordoned off and avoided. No damage to graveyards in any way.	▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities within demarcated areas. ▪ Demarcate graveyards in the south-east and monitor that this area is avoided by workers during the decommissioning phase.	▪ Weekly ▪ Ongoing during decommissioning phase.	▪ ECO ▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
13.10. Scarring of the landscape once infrastructure has been removed.	Ensure that the landscape within the development footprint has a similar appearance to that around it.	13.10.1. Ensure removal of all foundations, construction materials and foreign matter. 13.10.2. Ensure rehabilitation of the site in accordance with environmental guidelines.	▪ Follow the relevant environmental guidelines.	▪ Throughout the decommissioning phase.	▪ ECO

APPENDIX 13 A: CHANCE FOSSIL FINDS PROTOCOL

<table>
<tr><th colspan="3">Appendix 13 A: CHANCE FOSSIL FINDS PROTOCOL: KUDUSBERG WEF between Matjiesfontein and Sutherland</th></tr>
<tr><td>Province & region:</td><td colspan="2">Western Cape (Cape Winelands District Municipality) and Northern Cape (Namakwa District Municipality)</td></tr>
<tr><td>Responsible Heritage Management Authority</td><td colspan="2">Heritage Western Cape for the Western Cape (Contact details: Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za) and SAHRA for the Northern Cape (Contact details: South African Heritage Resources Agency. 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel : 021 462 4502).</td></tr>
<tr><td>Rock unit(s)</td><td colspan="2">Abrahamskraal Formation (Lower Beaufort Group), Late Caenozoic alluvium</td></tr>
<tr><td>Potential fossils</td><td colspan="2">Fossil vertebrate bones, teeth, large burrows, trackways, petrified wood, plant-rich beds in the Abrahamskraal Fm bedrocks. Fossil mammal bones, teeth, horncores, freshwater molluscs, plant material in Late Caenozoic alluvium.</td></tr>
<tr><td rowspan="5">ECO protocol</td><td colspan="2">1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary.</td></tr>
<tr><td colspan="2">2. Record key data while fossil remains are still in situ:
• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo
• Context – describe position of fossils within stratigraphy (rock layering), depth below surface
• Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering)</td></tr>
<tr><td>3. If feasible to leave fossils in situ:
• Alert Heritage Management Authority and project palaeontologist (if any) who will advise on any necessary mitigation
• Ensure fossil site remains safeguarded until clearance is given by the Heritage Management Authority for work to resume</td><td>3. If not feasible to leave fossils in situ (emergency procedure only):
• Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)
• Photograph fossils against a plain, level background, with scale
• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags
• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist
• Alert Heritage Management Authority and project palaeontologist (if any) who will advise on any necessary mitigation</td></tr>
<tr><td colspan="2">4. If required by Heritage Management Authority, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.</td></tr>
<tr><td colspan="2">5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Management Authority</td></tr>
<tr><td>Specialist palaeontologist</td><td colspan="2">Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Authority. Adhere to best international practice for palaeontological fieldwork and Heritage Management Authority minimum standards.</td></tr>
</table>

14 HERITAGE AND FOSSIL CHANCE FIND PROTOCOL

CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the

conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent. Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;

- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;

- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:

- The date

- A description of the discovery

- A description of the fossil and its context (e.g. position and depth of find)

- Where and how the find has been stored

- Photographs to accompany the preliminary report (the more the better):

- A scale must be used

- Photos of location from several angles

- Photos of vertical section should be provided

- Digital images of hole showing vertical section (side);

- Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.

- If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	*Lat:*	*Long:*
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	*Digital image of vertical section (side)*	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

15 SPECIFIC PROJECT RELATED ENVIRONMENTAL IMPACTS

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
A.1. TERRESTRIAL ECOLOGY IMPACTS					
Potential impact on terrestrial ecology as a result of the proposed Kudusberg WEF and associated infrastructure.	Avoid or minimize impacts on terrestrial ecology on site. This is particularly important regarding the placement of the infrastructure to reduce the chances of the loss of SCC, avoiding cliffs and rocky sheets and road design to minimize erosion.	▪ Ensure that the design of the WEF takes the sensitivity mapping of the Ecological Impact Assessment (please refer to Appendix D of the BA Report and the site sensitivity mapping provided in Appendix B of the EMPr) into account to avoid and reduce impacts on Species and Habitats of Conservation Concern. ▪ Results of site visits to locate SCC should also be considered. ▪ Location of footprint such that no threatened are affected. ▪ The cliffs and rocky sheets as delineated by the ecologist are no- go areas and should be avoided entirely. ▪ A walk-through prior to construction of the access roads, construction site, substation, turbines and crane pads to assess the presence of threatened SCC is proposed.	▪ Ensure that this is taken into consideration during the planning and design phase.	▪ During design cycle and before construction commences.	▪ Holder of the EA ▪ Appointed Ecology Specialist
A.2. IMPACT ON AVIFAUNA (BIRDS)					
Potential impacts on avifauna (as a result of the proposed Kudusberg WEF and associated infrastructures) in future	Avoid or minimise the impacts on the avifauna present on site.	▪ Ensure that the design of the WEF takes the sensitivity mapping of the avifauna specialist (Avifauna specialist study included in Appendix D of this BA Report and in Appendix B of the EMPr) into	▪ Ensure that the design of the WEF takes the sensitivity mapping of the avifauna specialist into account to avoid and reduce impacts of	▪ During design cycle and before construction commences.	▪ Holder of the EA ▪ Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
project phases, such as loss of habitat, fatality due to collision, disturbance, displacement and population decline.		account to avoid and/or reduce the impacts on Species and habitats of Conservation Concern. ▪ Regarding the above, minimise the footprint of the construction to an acceptable level, as defined by the avifaunal specialist. ▪ Use existing road networks as far as possible. ▪ Design an avifauna monitoring programme in accordance with Best Practice Guidelines during the construction and operational phases of the project to monitor the impact on birds during these phases. ▪ All overhead power lines must be signed off as "bird-friendly" by an avifaunal specialist prior to construction. ▪ Power lines should cross very-high sensitive areas as little as possible, but should mainly aim to not be orientated perpendicularly to known flight bird paths. Instead, to reduce the risk of collision, the orientation should rather be parallel to these flight paths. This should be further assessed for approval by the avifaunal specialist as soon as the power line layout becomes available (to be subject of a separate basic assessment report).	avifauna species and important features (See project sensitivity mapping in Appendix B of the EMPr). ▪ Ensure that the overhead power lines are signed off by the avifaunal specialist. ▪ Power line design to ensure that it crosses high sensitive areas as little as possible and that it is not orientated perpendicularly to known flight paths.	▪ During design cycle and before construction commences.	
A.3. IMPACT ON BATS					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Potential impacts on bats (as a result of the proposed Kudusberg WEF and associated infrastructures) in future project phases, such as habitat loss, fatality, disturbance, displacement and population decline.	Avoid or minimise impacts on bat community on site.	▪ Ensure that the design of the WEF takes the sensitivity mapping of the bat specialist (Bat specialist study included in Appendix D of this BA Report) into account to avoid and reduce impacts on bat species and bat important features. ▪ Regarding the above, minimise the footprint of the construction to an acceptable level, as defined by the bat specialist i.e. no placement of turbines in very-high sensitive areas. Refer to the project sensitivity mapping in Appendix B of the EMPr to view the four bat roots identified on site and bat sensitive areas and buffers to be avoided. ▪ Design a bat monitoring programme in accordance with Best Practice Guidelines during the construction and operational phases of the project to monitor the impact on bats during these phases. ▪ Use existing road networks as far as possible.	▪ Ensure the very high (no-go) areas identified for the bat community should be excluded from turbine placement and the areas considered as high sensitivity avoided as much as possible, during the planning and design phase (see project sensitivity mapping in Appendix B).	▪ During design cycle and before construction commences.	▪ Holder of the EA
A.4. IMPACTS ON FRESHWATER ECOLOGY					
Potential impact on freshwater ecology as a result of the proposed Kudusberg WEF and associated infrastructure.	• Limit the disturbance of aquatic habitat. • Minimise potential to modify flow / hydraulics related impacts and increase	• Ensure final layout of WEF (except roads and power lines) avoids watercourses and recommended buffers as far as possible; utilise existing disturbed areas where possible. Refer to the project sensitivity mapping in Appendix B of the EMPr to view	Ensure that this is taken into consideration during the planning and design phase.	During design cycle and before construction commences.	▪ Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	the potential for erosion	the freshwater sensitive areas and buffers to be avoided. • A comprehensive stormwater management plan should be compiled for the compacted surfaces within the site by the project engineer with input from the freshwater specialist. The plan should aim to reduce the intensity of runoff particularly on the steeper slopes and reduce the intensity of the discharge into the adjacent drainage lines. Where necessary measures to dissipate flow intensity or protect erosion should be included in the plan. Adjacent to wetland areas, the plan should encourage infiltration rather than runoff and should prevent the impedance of surface or sub-surface flows. The plan should also mitigate any contaminated runoff from the construction and operation activities from being discharged into any of the aquatic features within the site. • Adequate erosion mitigation measures should be incorporated into designs. • For any new infrastructure placed within the watercourses: o The structure should not impede or concentrate the flow in the watercourse without required WUL/ GA.			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		○ The structure should also be placed at the base level of the channel and be orientated in line with the channel. and ○ Any rubble or waste associated with the construction works within the aquatic features should be removed once construction is complete. • Water consumption requirements for the site for the construction and operation of the site if not obtained from an authorised water user within the area, must be authorised by the Department of Water and Sanitation (DWS). • No liquid waste should be discharged into any of the aquatic features within the site without the approval of the DWS. Wastewater should be properly contained on-site and removed to a licensed wastewater treatment facility that is able to treat the wastewater.			
A.5. VISUAL IMPACTS					
Potential visual impact	Reduce the visual impact on the landscape.	▪ No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed application site (i.e. 500 m exclusion buffers – see Section 1.6.2 of the VIA in Appendix D of the BA Report). ▪ Where possible, fewer but larger turbines with a greater output should be utilised	▪ Ensure that these measures are taken into account during the design phase.	▪ During design phase and before construction commences. ▪ Once-off during the design phase.	▪ Project Developer ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		rather than a larger number of smaller turbines with a lower capacity. ▪ Turbine colours should adhere to Civil Aviation Authority (CAA) requirements. ▪ If possible, the operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. In addition, non-reflective surfaces should be utilised where possible. ▪ Select the alternatives that will have the least impact on visual receptor locations.			
A.6. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
Impacts to archaeology, graves and palaeontological material.	Achieve a layout that minimizes the potential impacts to archaeological resources, graves and/or palaeontological material.	▪ Ensure that project layout avoids as many known archaeological resources, graves and/or palaeontological material as possible, in close proximity to the proposed development footprint (refer to the Heritage Impact Assessment (HIA) for the areas to be avoided and buffers to be implemented). The revised layout 1 adheres to the recommended buffers and is the preferred option. ▪ The proposed alignment for Access Road Alternative 1 should be subjected to a walk-down by an archaeologist prior to commencement of development to identify any areas or sites that require protection or mitigation, should it be selected. ▪ Conduct a walk-down survey of the final approved layout before construction. ▪ The following buffers must be applied:	▪ Take cognizance of the archaeological and palaeontological sites reported in the Heritage Impact Assessment (HIA) when designing facility and road layout. Refer to the project sensitivity mapping in Appendix B to view the heritage sensitive areas and buffers to be avoided. ▪ Appoint a professional archaeologist to carry out a pre-construction walk down survey. The walk-down report must be submitted to SAHRA prior to the construction phase. No construction may commence without comments from SAHRA in this regard.	▪ Once-off (prior to construction) ▪ Once-off ▪ On-going	▪ Project Developer ▪ Heritage specialist ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		❖ Graves: no development should be permitted within 50 m of identified graves and cemeteries; existing roads within this buffer should not be altered or widened; ❖ Cave site (KDB045): construction staff should not be permitted within 200 m of the site; ❖ Farmsteads: no turbines should be located within 500 m of farmsteads; and ❖ Kraals, stone walling and ruins > 100 years: construction staff should not be permitted within 100 m of these sites and no development should occur within 15m of these sites.	▪ Ensure and verify that the significant palaeontological and archaeological sites identified in the HIA are included on project maps and regarded as no-go zones with buffers during the planning and design phase.		
Impacts to the natural and cultural landscape.	Reduce the degree of visual contrast in the landscape.	▪ Plan to use an earth-coloured paint on the built elements of the facility.	▪ Include earth-coloured paint in the design specifications for the facility.	▪ Once-off	▪ Project Developer
A.7. SOCIO-ECONOMIC IMPACTS					
Employment creation for construction, operation and decommissioning activities.	▪ To reduce the unemployment rate in local municipality. ▪ Promote local employment opportunities.	▪ Advise on the set-up of a skills desk and where it will be situated. Provide awareness of skills desk for local communities. ▪ Set up a complaints register/grievance mechanism to allow any potentially negatively affected party to raise its concerns, which are then assessed and resolved.	▪ Create a skills requirement profile for both construction and operations. ▪ Set-up skills desk at a central and accessible location. ▪ Create awareness of skills desk through posters and media announcements.	▪ Design phase (in place before commencement of construction).	▪ Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Skills desk should serve to record local job seeker skills. ▪ Identify potential candidates and fill vacancies. ▪ A complaints register/grievance mechanism must be available on site at all time to any individual who may have a complaint. These complaints must be noted and suitable action taken to address the complaint. ▪ All landowners will be provided with contact details where they can lodge grievances. ▪ The holder of the EA will keep a register of all the complaints/grievances lodged. ▪ Feedback on all complaints will be provided within 10 days.		
A.8. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Erosion occurring on site due to the development of the proposed Kudusberg WEF.	No erosion on or downstream of the site due to the disturbance and existence of hard surfaces.	▪ Design an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.	▪ Ensure that the storm water run-off control is included in the engineering design.	▪ Once-off during the design phase.	▪ Holder of the EA
A.9. NOISE IMPACTS					
Impacts of increased noise levels on noise sensitive receptors	Reduce/avoid the impact of noise on noise sensitive receptors	▪ Ensure that the project layout avoids sensitive noise receptors, including residences (buffers of 500 m should be adhered to).	▪ Ensure that the recommended mitigation measures and buffers are implemented as proposed by the specialist.	▪ During design cycle and before construction commences.	▪ Project Developer
B. CONSTRUCTION PHASE					
B.1. TERRESTRIAL ECOLOGY (FAUNA & FLORA) IMPACTS					

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Clearance of vegetation	Confine vegetation clearance to footprint and minimize disturbance of adjacent areas.	▪ Demarcate all infrastructure sites clearly to avoid unnecessary clearance of the vegetation. ▪ Restrict driving to designated roads. ▪ Permits have to be obtained for the removal of Northern Cape Nature Conservation Act (NCNCA) and Western Cape Nature and Environmental Conservation Ordinance (WCNECO) protected species. ▪ Location of footprint such that no threatened Species of Special Concern (SCC) are affected. ▪ No fuelwood collection. ▪ The cliffs and rocky sheets as delineated by the ecologist are no- go areas and should be avoided entirely.	▪ Ensure that mitigation measures are enforced.	▪ Every three months	▪ The ECO should monitor and report any incidences to the Holder of the EA.
Impact on animal behavior.	Avoid or minimize impacts that could potentially affect animal behavior.	▪ Restrict night driving during construction phase. ▪ Proper waste management procedures should be put in place. ▪ Ensure electrical fences are built according to standards of Nature Conservation Authorities. ▪ Appropriate lighting to be installed in construction camp to minimize effect on nocturnal animals.	▪ Ensure compliance with these mitigation measures.	▪ Every three months ▪ As required	▪ The ECO should monitor and report to the Holder of the EA.
Illegal collecting of animals/plants.	Avoid loss of SCC through illegal collecting.	▪ Ensure proper access control of the site. ▪ Staff and contractor training and education programmes.	▪ Implement proper site access control.	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Increased dust levels.	Avoid or minimize increased dust levels.	▪ Dust control measures should be implemented. ▪ The generation of dust must comply with the National Dust Control Regulations (GN No. R. 827 of 1 November 2013), promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).	▪ Ensure that dust control measures are in place. ▪ Make sure the generation of dust complies with the said Regulations.	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.
Invasion of Alien plant species.	Avoid invasion by alien plant species.	▪ Implement a monitoring program for the early detection of alien invasive plant species. ▪ A control program to combat declared alien invasive plant species should be employed.	▪ Ensure implementation of an alien control programme to combat alien invasive plants (Refer to Section 4 of the EMPr).	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.
B.2. BIRD IMPACTS					
Habitat loss.	Reduce the extent of habitat destruction caused by the clearings for the working areas, to only the extent required.	▪ An ECO should be appointed to oversee that the EMPr is being adhered to. ▪ ECO Training & Education of bird and energy related impacts. ▪ Clearance and removal of natural vegetation should be kept to a minimum. ▪ Provide sufficient drainage along access roads to prevent erosion and pollution of adjacent watercourses or wetlands. No chemical spills or any other material dumps should be allowed within the WEF implementation area, with special	▪ Monitor the efficiency of the EMP and revise, if necessary. Also monitor whether proposed measures are being adhered to or not. ▪ The ECO should be trained to identify priority bird species, as well as their breeding habits/locations. ▪ The ECO should monitor the removal of natural vegetation. If significant portions of natural vegetation are removed in very high sensitive areas,	▪ EMPr efficiency monitoring during the construction phase. ▪ Training of ECO to be conducted shortly before construction commences. ▪ Natural vegetation removal monitoring during the	▪ Holder of the EA to appoint ECO ▪ Avifaunal specialist to conduct training of ECO, if ECO is not educated and trained already ▪ ECO ▪ ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		focus on areas nearby riparian vegetation or drainage lines. ▪ Areas with large trees, as identified on site, should be retained as much as possible as they serve as potential roosting and breeding habitat for a variety of birds, including raptors. In instances where the removal of trees cannot be avoided, e.g. in the power line servitude, the minimum number of trees should be removed in order to meet the legal and safety requirements. ▪ No off-road driving. ▪ The following buffers must be applied: - Riverine thickets: Considering the scarceness and sensitivity of this vegetation type to land modifications, a 200 m protection buffer is considered around the margins of the waterlines with this type of vegetation. No turbine placement or substation placement is allowed to occur within these buffered zones. Overhead Power lines and roads are allowed to be built within these buffered areas, as long as they only cross these areas perpendicularly and don't run in parallel with them. Existing roads should be used/upgraded as far as possible, within these areas. - Water bodies: As these supply important sources of water, nesting	then an appropriate rehabilitation specialist should be consulted for further actions. ▪ The ECO should monitor and prevent any erosion and pollution (chemical spills etc.) within the WEF boundaries, particularly when associated with water features such as drainage lines, riparian vegetation and water bodies / wetlands. ▪ Driving should, at all times, remain on existing or newly constructed roads. This should be strictly monitored so that habitat destruction does not occur.	construction phase. ▪ Erosion and pollution monitoring during the construction phase. ▪ Monitoring of potential off-road driving to occur during construction phase.	

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		and resting locations for many bird species (not only waterbirds), a 200 m protection buffer is considered around any potential margins of water present within the study area. - Sensitive Flight Paths: a grid analysis was conducted to determine the use of geographical space by certain bird species. Only sensitive species with >0.25 contacts per hour were considered in each 500 x 500 m no-go square. A 200 m buffer was then applied around each square to account for potential sensitive flight paths occurring on the inner border of each square.			
Displacement effects.	Minimise displacement effects of the bird community due to on-site disturbances.	▪ Minimise on-site disturbances. ▪ No construction is allowed to occur within 1km of any known Verreaux's Eagle nests during the breeding season.	▪ Reduce noise levels as far as possible.	▪ During the construction phase.	▪ Construction staff to adhere. ▪ ECO to oversee.
Fatalities due to collision.	Prevent mortality of sensitive bird species due to collision with wind turbines and associated infrastructures.	▪ Internal 33 kV lines must be placed underground as far as possible, excluding sections where there may be geotechnical or other physical obstacles. ▪ Fit bird flight diverters to overhead power lines and weather mast guyed wires to allow them to be more visible to bird species. The spacing of devices should be not more than 5-10 m apart.	▪ Attach bird flight diverters to overhead power lines and weather mast guyed wires, to increase the visibility of these structures to low flying birds. ▪ Power lines should never run perpendicularly to known flight paths. They should only be orientated parallel to	▪ During the construction phase. ▪ During the construction phase. ▪ During the construction phase.	▪ Holder of the EA to ensure this is installed. ▪ Construction staff to implement. ▪ ECO to oversee.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Power lines should cross very high sensitive areas as little as possible, but should mainly aim to not be orientated perpendicularly to known bird flight paths. ▪ Lowest tip of turbines blades should not be lower than 40 m.	these flight paths – to avoid an increased risk of collision. ▪ To prevent collisions of small passerine species and low-flying birds, the lowest blade tip should not be lower than 40 m. ▪ Power line design to ensure that power lines do not cross very high sensitive areas as far as possible. It should not be orientated perpendicularly to known flight paths ▪ To ascertain that the overhead power lines are relatively safe for the bird community, they should be signed off as being "bird-friendly" by the avifaunal specialist, prior to construction.		
Mortality of Red Data avifauna (birds) due to disturbance during construction phase.	Prevent Mortality of Red Data avifauna due to disturbance from construction activities.	▪ Develop and implement a Construction EMP (CEMP) (minimum one year) to assess disturbances occurring on site. ▪ CEMP to be done in accordance with the relevant Best Practice Guidelines at the time. ▪ An ECO should be appointed to oversee that the EMP is being adhered to. ▪ ECO Training & Education of bird and energy related impacts. ▪ Minimise on-site disturbances.	▪ Appoint a suitably qualified avifaunal specialist. ▪ Monitor the efficiency of the CEMP and revise if necessary. ▪ Site visits and monitoring to ensure that the recommendations are adhered to. ▪ Training to be provided to the ECO and Facility manager to identify Red	▪ Once-off before construction commences. ▪ CEMP to be implemented for a minimum of a year during the construction phase. ▪ Daily site visits.	▪ Holder of the EA to appoint avifaunal specialist. ▪ Avifaunal specialist to provide training to ECO, if not trained and educated already.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Existing roads and farm tracks should be used where possible; ▪ The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths; ▪ Sensitive zones and no-go areas (e.g. nesting areas) are to be avoided as indicated in the Bird Impact Assessment (Appendix D) (see project sensitivity mapping in Appendix D for areas to be avoided); ▪ No off-road driving; ▪ ECO to oversee activities and ensure that the CEMP is implemented and enforced; ▪ Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded; ▪ The construction Phase ECO, the contractor, the Facility Manager and the onsite Environmental Manager, and are to be trained to identify Red Data and priority bird species, as well as their nests. If any nests or breeding locations	Data and priority bird species, as well as their nests. ▪ Rehabilitation specialist should be appointed and the effectiveness of rehabilitation to be monitored post construction. ▪ Relevant Best Practice Guidelines to be implemented during the construction phase.	▪ Training to be provided before construction commences.	▪ Construction staff to adhere. ▪ ECO to oversee

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		for this species are located, the avifaunal specialist is to be contacted for further instruction; ▪ Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the CEMP.			
B.3. BAT IMPACTS					
Habitat Loss.	Avoid habitat destruction caused by opening clearings for the working areas, construction of roads and landscape.	▪ An independent ECO should be appointed to oversee that the EMPr is being adhered to. ▪ Training & Education of the ECO and construction staff on bat and energy related impacts. ▪ Clearance and removal of natural vegetation should be kept to a minimum. ▪ Provide sufficient drainage along access roads to prevent erosion and pollution of adjacent watercourses or wetlands. No chemical spills or any other material dumps should be allowed within the WEF implementation area, with special focus on areas nearby riparian vegetation or drainage lines. ▪ No off-road driving.	▪ Monitor the efficiency of the EMP and revise, if necessary. Also monitor whether proposed measures are being adhered to or not. ▪ The ECO should be trained to identify bat species, as well as their roosts locations. If any building, trees, or any structure with potential to provide bat roosting, needs to be demolished or removed, then a visit should be conducted, prior to the commencement of the works, by one specialist to verify the presence/absence of bats; ▪ The ECO should monitor the removal of natural	▪ EMPr efficiency monitoring during the construction phase. ▪ Training of ECO to be conducted shortly before construction commences. ▪ Natural vegetation removal monitoring during the construction phase. ▪ Erosion and pollution	▪ Project Developer ▪ Contractor ▪ ECO ▪ Avifaunal specialist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Confine clearance to footprint of development and demarcate all footprints clearly. ▪ The following buffers must be applied: ❖ High sensitivity – 200 m around all potentially bat important features: ❖ Along water lines and associated riverine vegetation. Such features are important for bats, since they are likely to act as commuting routes, providing food resources, likely to be associated with higher bat activity, and likely to favour the occurrence of dispersion routes, besides local commuting routes. ❖ A 200 m buffer was considered around those features. It is recommended that should new infrastructures (including roads and electrical infrastructures) cross these features (including buffers), then they should not be routed to run parallel with them, but rather cross them perpendicularly, as far as possible. Additionally, this avoidance recommendation will not include the use of existing roads, as long as they are not upgraded in such a manner that will re-route them (to be more parallel with the feature) within those buffered areas. However, no wind turbines or substations may be	vegetation. If significant portions of natural vegetation are removed (significantly more than what is currently proposed) in very high sensitive areas, then an appropriate rehabilitation specialist should be consulted for further actions. ▪ The ECO should monitor and prevent any erosion and pollution (chemical spills etc.) within the WEF boundaries, particularly when associated with water features such as drainage lines, riparian vegetation and water bodies / wetlands. ▪ Driving should, at all times, remain on existing or newly constructed roads. This should be strictly monitored so that habitat destruction does not occur. ▪ Buffers to be adhered to.	monitoring during the construction phase. ▪ Monitoring of potential off-road driving to occur during construction phase.	

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		permanently placed within any of these buffered areas. ❖ Very High sensitivity (No-Go): ❖ Confirmed Roosts. There are four confirmed roosts within the proposed Kudusberg WEF. During ultrasound monitoring and inspection of the roosts, it was confirmed that bats are using the identified buildings as roosts. While the number of individuals using the roosts remain relatively uncertain, we estimate that there are at least about 1-50 individuals, resulting in a 500 m buffer, considering the known occurrence species with medium-high and high risk of collision with wind turbines. As such, no wind turbines, electrical infrastructure, substations or new roads may be permanently placed within the buffered areas. However, the use of existing roads may be used, as long as they are not upgraded in such a manner that will cause them to be re-routed and subsequently run more perpendicular to the roosts (and their buffered areas).			
Mortality of Red Data avifauna (bats) due to disturbance during construction phase.	Prevent Mortality of Red Data avifauna due to construction activities.	▪ A site-specific CEMP must be created, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of bat habitat. All contractors are to adhere to the	▪ Appoint a suitably qualified bat specialist. ▪ Monitor the efficiency of the CEMP and revise if necessary.	▪ Once-off before construction commences. ▪ CEMP to be implemented	▪ Holder of the EA to appoint avifaunal specialist. ▪ Avifaunal specialist to

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		CEMP and should apply good environmental practice during construction. ▪ It is recommended that a bat specialist surveys the confirmed turbine locations and the locations of all other site infrastructure, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats before any construction activities commence and once the preliminary design and layout of the site is complete. ▪ A buffer of 200 m must be maintained around potentially important bat features such as along water lines and associated riverine vegetation. It is recommended that should any new infrastructure (including roads and electrical infrastructure) cross these features, then they should not be routed to run parallel with them, but rather cross them perpendicularly, as far as possible. This does not apply to use of existing roads. No wind ▪ No construction activities with the potential to physically affect any bat roosts will be permitted without the express permission of a suitably qualified bat specialist following appropriate investigation and mitigation.	▪ Site visits and monitoring to ensure that the recommendations are adhered to. ▪ Training to be provided to the ECO, Contractor and Facility manager to identify Red Data and priority bat species, as well as their nests. ▪ Rehabilitation specialist should be appointed and the effectiveness of rehabilitation to be monitored post construction. ▪ Relevant Best Practice Guidelines to be implemented during the construction phase. ▪ Buffers to avoid bat sensitive areas to be adhered to.	for a minimum of a year during the construction phase. ▪ Daily site visits. ▪ Training to be provided before construction commences.	provide training to ECO, if not trained and educated already. ▪ Construction staff to adhere. ▪ ECO to oversee

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Four roosts are confirmed on the Kudusberg WEF site. These should be buffered by 500 m as recommended in the Bat Impact Assessment (Appendix D of the BAR and in sensitivity mapping provided in Appendix B of the EMPr). This is according to the current South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction: 4th Edition. South African Bat Assessment Association. However, the applicable Best Practice Guidelines at the time of construction and operation should be implemented. ▪ Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the CEMP.			
Displacement Effects.	Minimise displacement effects of the bat community due to on-site disturbances.	▪ Minimise on-site disturbances.	▪ Reduce noise levels as far as possible.	▪ During the construction phase.	▪ ECO ▪ Construction Manager or Contractor
B.4. IMPACTS ON FRESHWATER ECOLOGY					
▪ Loss of watercourse vegetation, associated habitat and ecosystem services;	▪ Limit the disturbance of aquatic habitat. ▪ Limit potential for contamination/polluti	▪ All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential;	▪ Monitoring that no-go areas are adhered to should be undertaken on an ongoing basis for the duration of the construction phase.	▪ Ongoing during construction	▪ Project Developer ▪ Contractor ▪ ECO ▪ ESO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
▪ Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles. ▪ Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream watercourse areas; ▪ Exposure of soils, leading to increased runoff, and erosion, and thus increased sedimentation of the watercourses; ▪ Increased sedimentation of the watercourses, leading to smothering of vegetation associated in the watercourses; and	on of aquatic ecosystems ▪ Limit the removal of vegetation and associated disturbances to soils ▪ Limit the potential of sedimentation ▪ Limit the proliferation of alien and/or invasive vegetation as a result of disturbances ▪ Limit the alternation of runoff patterns within the watercourses, potentially leading to increased erosion and sedimentation of the watercourses	▪ Retain as much indigenous vegetation as possible; ▪ All vegetation removed as part of the site clearing activities (specifically where large areas need to be cleared) should be transported from the construction site (may not be stockpiled) and disposed of at a registered waste disposal facility; ▪ During construction of the surface infrastructure within close proximity to a watercourse, regular spraying of non-potable water or the use of chemical dust suppressants must be implemented to reduce dust and to ensure no smothering of vegetation within the watercourses occurs from excessive dust settling. It must be noted that specifics as to what type of dust suppressant (grey water vs. chemical dust suppressant) that will be utilised as part of the proposed Oya WEF was not available at the time of assessment. Should this detail become available, it is recommended that the freshwater ecologist provide a statement on the suitability of the use of the proposed dust suppressant; ▪ The watercourses outside the construction footprint with approved crossings must be considered as no-go	▪ Ongoing monitoring of implementation of method statements and rehabilitation measures should be undertaken in the construction phase. ▪ Monitoring, on a needs by needs basis as advised by ECO, of basic water quality constituents (Dissolved oxygen, electrical conductivity, suspended solids, and pH) should be undertaken upstream and downstream of sites where construction activities will need to take place within aquatic features. This should be accompanied with ongoing visual inspections. ▪ An ECO or a specialist with knowledge and experience of the local flora, should be appointed during the construction phase to be able to make clear recommendations with regards to the revegetation of disturbed areas. ▪ Implement and adhere to the recommended buffers.		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
▪ Proliferation of alien and/or invasive vegetation as a result of disturbances. ▪ Earthworks and exposure of soils could result in sedimentation of the watercourses, which may be transported as runoff into the downstream watercourse areas and may smother vegetation associated with the watercourses; ▪ Disturbances of soils leading to increased alien vegetation proliferation within the terrestrial buffer zone surrounding the watercourses, with the potential to affect the watercourse habitat; ▪ Altered runoff patterns within the local catchment of the watercourses, potentially leading to		areas. No construction vehicles, nor construction personnel or vehicles may traverse through these watercourses (except on approved road crossings); ▪ As far as possible, existing roads must be utilised to gain access to sites; ▪ Contractor laydown areas, and material storage facilities to remain outside of the 32 m ZoR; ▪ All vehicle re-fuelling is to take place outside of the 32 m ZoR; and ▪ No vegetation may be removed from the 32 m ZoR surrounding the watercourse where no infrastructure is planned, as this provides a natural buffer zone around the watercourses which disperse surface runoff into the watercourses, and thus prevents sedimentation and erosion thereof ▪ It is imperative that all construction works be undertaken during the driest period of the year when there is no flow within the watercourses, and thus no diversion of flow would be necessary; ▪ The reaches of the watercourses where no activities are planned to occur must be considered no-go areas. These no-go areas can be marked at a maximum distance of 5 m upstream and downstream of the proposed road			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
increased erosion and sedimentation of the watercourses; ▪ Potential impacts on the water quality of surface water runoff (when present) which may potentially enter the watercourses and contamination of soils due to concrete casting; and ▪ Potential of backfill material entering the watercourses, increasing the sediment loads therein ▪ Potential of imported materials to entering the watercourses, increasing the sediment loads therein		upgrade crossing. This 5 m buffer area would allow for construction personal, vehicles (if applicable) to enter the watercourse crossing where the road is proposed to be upgraded; ▪ For trenching of the cables, the topsoil has to be stored separately and may not be contaminated. Furthermore, the soil layers should be replaced in the same order and the topsoil returned last; ▪ Contractor laydown areas, vehicle re-fuelling areas and material storage facilities are to remain outside of the watercourses and at least 32 m from the delineated extent; and ▪ The removed vegetation must be stockpiled outside of the delineated boundary of the watercourse. The footprint areas of these stockpiles should be kept to a minimum, and may not exceed a height of 2 m. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site With regards to ground-breaking activities at least 32 m from the delineated extent of a			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		watercourse, but within the 100 m GN509 ZoR: ▪ During excavation activities, the topsoil and vegetation should be stockpiled separately from other material outside of the 32 m NEMA ZoR; ▪ Excavated materials should not be contaminated, and it should be ensured that the minimum surface area is taken up by any stockpiled materials. The mixture of the lower and upper layers of the excavated soil should be kept to a minimum, so as for later use as backfill material after construction has commenced; ▪ All exposed soils must be protected from wind using tarpaulins for the duration of the construction phase to prevent potential erosion and sedimentation of the watercourses; ▪ Suitable drainage should be insured along the crane pads, in order to ensure that water does not pond on the crane pad or drain in a concentrated manner into the watercourses. This must be considered as part of the stormwater management plan and be overseen by a freshwater ecologist; ▪ Construction of the proposed surface infrastructure may result in disturbance			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		to the natural buffer zone surrounding the watercourses which may result in the reduction of surface roughness. This can be mitigated by ensuring that no concentrated runoff from the surface infrastructure construction areas enter the watercourses by installing silt traps or placing haybales down gradient of the construction footprint (until suitable basal vegetation cover has been restored) to ensure no sediment laden or concentrated runoff generates from the construction footprint; and ▪ It is highly recommended that an alien vegetation management plan be compiled during the planning phase and implemented concurrently with the commencement of construction. <u>With regards to concrete mixing on site:</u> ▪ No mixed concrete may be deposited outside of the designated construction footprint; ▪ Protective equipment should be provided, onto which any mixed concrete can be deposited while it awaits placing; and ▪ Concrete spilt outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site.			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		With regards to backfilling of excavated areas: ▪ Stockpiled material should be used as backfill material; ▪ All excavated areas should be backfilled to the natural ground level with excavated material; and ▪ Soil must be suitably compacted, and all construction material must be removed from the site upon the completion of construction or used in the rehabilitation process. Rehabilitation of the construction footprint areas: ▪ All footprint areas which have been compacted should be ripped and revegetated within indigenous vegetation as soon as the construction activities have been completed. This will prevent soil erosion and the creation of gullies within the operational area; and ▪ The operational area should regularly be inspected for alien and invasive vegetation species which might have established due to the construction activity related disturbances. ▪ During the upgrading of existing internal roads and associate cable installation that may potentially traverse watercourses, a buffer of no more than			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		5 m on either side of the road crossing footprint through the watercourses may be impacted. This area must be cordoned off, and no vehicles or personnel are permitted outside of the authorised construction area; ▪ Material to be used (gravel – if applicable) as part of the upgrading of the existing roads must be stockpiled outside the 32 m NEMA ZoR of the watercourses to prevent sedimentation thereof and to avoid any other vegetation being impacted by the construction activities. These stockpiles may not exceed a height of 2 m and should be protected from wind using tarpaulins; ▪ Any remaining soils following the completion of backfilling of the trenches are to be spread out thinly in an area within the watercourses to aid in the natural reclamation process; ▪ After upgrading of roads traversing watercourses, the area surrounding the road must be revegetated with suitable indigenous vegetation to prevent the establishment of alien vegetation species and to prevent erosion from occurring; ▪ It is highly recommended that an alien vegetation management plan be			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		compiled during the planning phase and implemented concurrently with the commencement of construction; and ▪ All existing alien and invasive vegetation should be removed. All material must be disposed of at a registered garden refuse site and may not be burned or mulched on site. ▪ The design of the new road crossings should ensure that no erosion occurs, specifically along the embankments of the watercourse. As such, vegetation must be established in the construction footprint immediately after the construction of the road/ installation of cables is complete; ▪ New road crossings must intersect the watercourse at a right angle (perpendicular) to minimise disturbance to the watercourse; ▪ No road crossing designs were available at the time of this assessment. However, it is strongly advised that suitably sized culverts be installed within all road crossings and vehicles should not be allowed to cross within the riverbed. This will ensure hydrological connectivity is maintained and no hydrocarbons are not washed into the downstream watercourses from potential vehicle spills. Should			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		road crossing designs become available, it is advised that it be revised by a freshwater ecologist; ▪ During the construction of roads and associate cable installation that may potentially traverse watercourses, a buffer of no more than 5 m on either side of the proposed road crossing footprint through the watercourses may be impacted. This area must be cordoned off, and no vehicles or personnel are permitted outside of the authorised construction area; ▪ Soils excavated from the cable trench must be stockpiled immediately upstream of the trench. Once the cable is installed the trench must be infilled with the removed material and suitably compacted to avoid any erosion and preferential flow paths from forming; and ▪ Any remaining soils following the completion of backfilling of the trenches are to be spread out thinly in an area within the watercourses to aid in the natural reclamation process.			
B.5. VISUAL IMPACTS					
Potential visual intrusion, dust and noise of construction activities.	Prevent unnecessary visual clutter and focusing attention of surrounding	▪ Carefully plan to minimise the construction period and avoid construction delays.	▪ Ensure that this is taken into consideration prior to the commencement of construction.	▪ Ongoing during construction phase. ▪ Weekly	▪ Contractor ▪ Holder of the EA ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	visual receptors on the proposed development.	▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Make use of existing gravel access roads where possible. ▪ Cables should be buried underground where possible. ▪ Ensure that dust suppression techniques are implemented on all access roads and stockpiles. ▪ Maintain a neat construction site.	▪ Conduct site inspections to monitor unnecessary vegetation clearing and report any non-compliance. ▪ Conduct site inspections to monitor effectiveness of dust suppression and to check on neatness of construction camp and report any non-compliance.	▪ Daily	
B.6. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
Construction of access roads, construction camp, substation and turbines lead to destruction of palaeontological material, archaeological remains, graves and built environment features.	Avoid destruction of palaeontological material, archaeological remains, graves and built environment features.	▪ ECO to conduct checks of surface clearance and excavations >1 m for fossil material and report finds to the Provincial Heritage Resources Agency (PHRA) or the South African Heritage Resources Agency (SAHRA) for recording by professional palaeontologist. ▪ Revised Layout 1 makes Access Road Alternative 1 preferred choice and Common Access 1 acceptable. ▪ Use Construction Camp 2. ▪ A Chance Find Procedure (see Appendix 13.A) must be followed if fossils are uncovered in the areas marked as High and Medium Palaeontological	▪ Monitoring of fossil finds during construction and reporting it to the relevant Heritage Authority. ▪ A Chance Find Procedure must be followed if fossils are uncovered. ▪ Monitoring of any archaeological finds and reporting it to the relevant Heritage Authority. ▪ A HMP must be compiled and submitted to SAHRA regarding the Northern Cape section. ▪ The relevant provincial Heritage Authority must be contacted immediately If any evidence of significant	▪ Daily during construction. ▪ During the construction phase ▪ Daily during construction. ▪ Before construction commences. ▪ During construction and immediate reporting following a finding.	▪ ECO ▪ Project Developer ▪ ECO ▪ Holder of the EA ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Sensitivity during the construction phase. ▪ New construction work, construction camps, substations or access roads should not impact negatively or threaten any of the historic built form, which is part of the history and land use evolution of the cultural landscape. To achieve this, a reasonable distance should be kept from all historic built features on the landscape, as has been addressed by the revised layout proposal. ▪ To allow for the clear management of the large amount of heritage resources identified within the development area, a Heritage Management Plan (HMP) must be compiled. The HMP must clearly differentiate between the relevant heritage authorities involved i.e. HWC and SAHRA. No construction may commence without comments from SAHRA in this regard. ▪ If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed	archaeological sites or remains be found on site.		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. Should sites or finds be located in the Western Cape, Heritage Western Cape needs to be informed immediately.			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Construction activities could result in damage to or destruction of archaeological sites and/or graves due to accidental/deliberate damage by people or vehicles.	Minimize the chances of significant archaeological sites and/or graves being disturbed.	▪ Placement of turbines and associated infrastructure to observe buffers. ▪ All site crew should be informed of the heritage significance of the resources in the study area, and those sites near development infrastructure, or easily reached (Table 2 in the Original 2018 HIA in Appendix C5b of EA Amendment Assessment Report) should be inspected by the ECO during the construction phase to ensure they are being respected. ▪ Cordon off vulnerable sites as no-go areas.	▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas.	▪ Weekly	▪ Project developer ▪ ECO
		▪ The Contractor and ECO must be informed of the possibility of any heritage material (i.e. ensure that all personnel are aware of the potential of encountering graves and what to do if this occurs (i.e. to report any suspicious stone features prior to disturbance)).	▪ Carry out Environmental Awareness Training to ensure that the Contractors are informed of the possible type of heritage features that may be encountered during the construction phase. ▪ Carry out visual inspections to ensure that no-go areas such as graves be avoided during the construction phase. ▪ Appoint a professional archaeologist to examine the construction footprint.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly ▪ Once-off six months prior to construction. ▪ As required/ necessary during the construction phase.	▪ Contractor/ ECO ▪ Archaeologist ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Conduct an audit to verify that the necessary permits are obtained by the archaeologist, if required.		
		If archaeological sites and potential graves cannot be avoided, the buffers as stipulated in the HIA (Appendix D) should be implemented during the construction phase: ▪ Graves: no development should be permitted within 50 m of identified graves and cemeteries; existing roads within this buffer should not be altered or widened; ▪ Cave site (KDB045): construction staff should not be permitted within 200 m of the site; ▪ Farmsteads: no turbines should be located within 500 m of farmsteads; ▪ Kraals, stone walling and ruins > 100 years: construction staff should not be permitted within 100 m of these sites and no development should occur within 15 m of these sites; and ▪ These sites should be cordoned off in advance of the development commencing (the mitigation archaeologist could be called on to assist with this if needed).	▪ Ensure archaeological sites are cordoned off. ▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas and outside of the buffer areas to ensure that the cordoned off areas remain free of disturbance.	▪ Once off before construction commences ▪ Weekly	▪ ECO/ ▪ Archaeologist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ The revised layout 1 adheres to the recommended buffers and is the preferred option. ▪ New construction work, construction camps, substations or access roads should not impact negatively or threaten any of the historic built form.			
		▪ If any of the graves or potential graves found on site cannot be avoided, then an archaeologist should be contracted to conduct a test excavation to determine the status of the feature. If it is determined to be a grave, then exhumation would need to occur (if necessary) with the permission of SAHRA (and in accordance with any requirements that SAHRA might impose at the time).	▪ Appoint a professional archaeologist to conduct a test excavation to determine if the sites are graves. ▪ Conduct an audit to verify that the necessary permits are obtained by the archaeologist for the test excavation, if required.	▪ As potential graves are encountered	▪ Project Owner
		▪ If any archaeological material or human burials are uncovered during the course of development, then work in the immediate area should be halted at once. The find should be reported to the heritage authorities (SAHRA in the Northern Cape and HWC in the Western Cape) and may require inspection by an archaeologist to determine whether mitigation should take place and what form that mitigation should take	▪ Monitor excavations and construction activities for archaeological materials via visual inspections and report the finds accordingly. ▪ Contact the heritage authorities and the identified archaeologist if any heritage features are uncovered.	▪ Daily or during excavations. ▪ As required/ necessary during the construction phase.	▪ Contractor and ECO ▪ Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ The alignment of the proposed road over the ridge saddle south of Pad se Hoek close to turbines 32 (-32.870067, 20.376674) and 33 (-32.868236, 20.381335) should be subject to an archaeological walkdown prior to construction.	▪ Appoint an archaeologist to do a walk down prior to construction to identify if any heritage features are uncovered.	▪ Once off prior to construction.	▪ Project Developer ▪ Archaeologist
B.7. PALAEONTOLOGICAL HERITAGE IMPACTS					
Potential impact on fossil heritage as a result of the proposed Kudusberg WEF and associated infrastructure.	Avoid or minimize impacts to fossils sites on site.	▪ The Environmental Site Officer (ESO) should be made aware of the potential occurrence of scientifically-important fossil remains within the development footprint. During the construction phase all major clearance operations (e.g. for new access roads, turbine placements) and deeper (> 1 m) excavations should be monitored for fossil remains on an on-going basis by the ESO. ▪ Implement the Chance Fossil Finds Protocol (See Appendix 13 A) in the event of the discovery of significant new fossils during the construction phase; ▪ Appoint suitably qualified palaeontologist for professional mitigation should new fossil sites be discovered. ▪ Should substantial fossil remains be encountered at surface or exposed during construction, the Environmental Site Officer (ESO) should safeguard	▪ Monitoring of all major surface clearance and deeper (> 1 m) excavations for fossil material (bones, teeth, petrified wood, plant-rich beds etc.). ▪ Significant fossil finds to be safeguarded and reported to Heritage Western Cape (Western Cape sites) or SAHRA (Northern Cape sites). ▪ Recording and sampling of important new fossil finds and relevant geological data. ▪ Implement the Chance Fossil Finds Protocol (See Appendix 13A.) ▪ Safeguard fossil remains encountered in situ. Alert relevant provincial Heritage Authority.	▪ On-going during construction phase. ▪ As soon as possible after fossils are found. ▪ During construction phase. ▪ As soon as possible after fossils are found. ▪ As soon as possible after fossils are found.	▪ ECO ▪ ECO ▪ Professional palaeontologist ▪ ESO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		these, preferably in-situ. They should then alert the relevant provincial heritage management authority as soon as possible;			
B.8. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					
Erosion occurring on site	No erosion on or downstream of the site due to the disturbance and existence of hard surfaces.	▪ Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.	▪ Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	▪ Monthly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Loss of topsoil due to poor topsoil management as a result of construction activities.	Ensure effective topsoil covering to conserve soil fertility on all disturbed areas, after they have been rehabilitated.	▪ Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion. ▪ If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them. ▪ After cessation of disturbance, re-spread topsoil over the surface. ▪ Dispose of any sub-surface spoils from excavations where they will not impact on land that supports vegetation, or where they can be effectively covered with topsoil.	▪ Establish an effective record keeping system for each area where soil is disturbed for construction purposes. These records should be included in environmental performance reports.	▪ As needed, dependent on the specifics of the construction activities.	▪ ECO
B.9. SOCIO-ECONOMIC IMPACTS					
Increase in production and GDP-R.	To maximize economic benefit to the local municipality.	▪ Procure goods and services, as far as practically possible, from within the local municipalities.	▪ Run a supplier day in neighbouring towns and identify prospective companies to engage with during construction ▪ Keep record of companies and businesses supplying goods and services	▪ Once off ▪ Bi-annually ▪ Once off	▪ Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Calculate split percentage of local and national/international companies		
B.10. NOISE IMPACTS					
Construction noise. Monitor construction noise.	Construction staff receives noise sensitivity training.	▪ Conduct noise sensitivity training for all construction staff.	▪ Keep records of noise training.	▪ Before construction commences	▪ Holder of the EA
	Noise levels at Noise Sensitive Areas (NSAs) should not exceed the requirements of SANS 10103.	▪ Ambient noise monitoring to be conducted within the project area.	▪ As per the requirements of SANS 10103	▪ Four times during the construction phase	▪ Specialist noise consultant
B.11. TRAFFIC IMPACTS					
Dust and noise pollution caused by transportation of material, components, equipment and staff to site.	Minimize impacts on road network.	▪ Stagger turbine component delivery to site ▪ The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network ▪ Dust suppression. ▪ Maintenance of gravel roads. ▪ Apply for abnormal load permits prior to commencement of construction. ▪ Assess the preferred route and undertake a 'dry run' to test. ▪ All low hanging overhead lines to be moved.	▪ Regular monitoring of road surface quality. ▪ Apply for required permits prior to commencement of construction.	▪ Before construction commences and regularly during construction phase.	▪ Holder of the EA ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Road design engineer to be consulted regarding design of internal roads.			
B.12. WASTE MANAGEMENT					
Pollution of the surrounding environment (including drainage lines) as a result of the handling, temporary stockpiling and disposal of general waste.	Reduce environmental impacts such as soil, surface water and groundwater contamination as a result of incorrect storage, handling and disposal of general waste. Minimise the production of waste. Prevent environmental problems (e.g. pollution / change in soil pH) due to solid and liquid wastes disposed of on the site. Ensure compliance with waste management legislation.	▪ General waste (i.e. construction waste, building rubble, discarded concrete, bricks, tiles, wood, glass, window panes, air conditioners, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) generated during the construction phase should be stockpiled temporarily (i.e. once-off) on site in a designated area within suitable waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. ▪ Where solid waste disposal is to take place on site, ensure that only non-toxic materials which have no risk of polluting the groundwater, are buried in designated approved areas at acceptable depths below ground level.	▪ Monitor the strategic placement of the temporary, designated waste stockpiling area at the site camp via visual inspections, and record and report any non-compliance. ▪ Monitor the temporary storage and handling of general waste on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area). ▪ Monitor the disposal of waste to ensure that only non-toxic waste is buried in designated approved areas at acceptable depths below ground level.	▪ Once-off prior to the commencement of the construction phase and as required as the construction phase process evolves. ▪ Daily ▪ Daily	▪ ECO and Contractor ▪ ECO ▪ ECO and Contractor
		▪ Should the on-site stockpiling of general waste exceed 100 m^3 and a period of 90 days, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.	▪ Record the amount of general waste that is temporarily stockpiled at the designated area on site, as well as the duration and record non-compliance and incidents.	▪ Daily ▪ Weekly ▪ Monthly	▪ Contractor ▪ ECO ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Monitor the duration and amounts of general waste that is temporarily stockpiled at the designated area on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area). ▪ Audit compliance with the Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) if the storage amounts are exceeded (i.e. only if required).		
		▪ Ensure that the designated stockpiling area for general waste (i.e. skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events.	▪ Monitor the temporary, designated waste stockpiling area at the site camp, as well as the handling of general waste on site via site audits and record non-compliance and incidents.	▪ Daily	▪ ESO
		▪ Ensure that general waste generated during the construction phase is removed from the site on a regular basis, and safely disposed of at an appropriate, licensed waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept	▪ Ensure that a suitable Waste Management Contractor is appointed to remove and dispose the general waste at an appropriate, licensed waste disposal facility. ▪ Monitor waste disposal slips and waybills via site audits	▪ Once-off prior to the construction phase. ▪ Weekly	▪ Project Developer / Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste.	and record non-compliance and incidents.		
		▪ Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.	▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Daily ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ ECO and Contractor ▪ ECO
		▪ Sufficient general waste disposal bins must also be provided for use by construction personnel throughout the site. These bins must be emptied on a regular basis.	▪ Monitor general waste generation by construction staff and collection via audits throughout the construction phase.	▪ Daily or Weekly	▪ ECO and Contractor.
		▪ Ensure that all general waste emanating from the construction phase is removed from site prior to the commencement of the rehabilitation and operational phases.	▪ Undertake a final inspection at the end of the construction phase in order to verify and ensure that all general waste is removed from site and correctly disposed, prior to the commencement of the rehabilitation and operational phases.	▪ At the end of the construction phase.	▪ ECO and Contractor.
		▪ Promote waste reduction, re-use, and recycling opportunities on site during the construction phase.	▪ Monitor waste generation and collection throughout construction.	▪ Weekly or bi-weekly	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Investigate if any, complaints have been expressed by the surrounding community regarding waste handling.		
		▪ Ensure an adequate and sustainable use of resources.	▪ Monitor waste generation and collection throughout construction.	▪ Weekly or bi-weekly	▪ ECO and Contractor
		▪ Control and implement waste management plans provided by contractors. Ensure that relevant legislative requirements are respected.	▪ Control of waste management practices throughout construction phase	▪ Weekly or bi-weekly	▪ ECO and Contractor
		▪ Normal sewage management practices should be implemented. These include ensuring that portable sanitation facilities are regularly emptied and the resulting sewage is contained and transported safely (by an appointed (suitable) service provider) for correct disposal at an appropriate, licensed facility. Proof of disposal (in the form of waste disposal slips or waybills) should be retained on file for auditing purposes. No waste water must be discharged to the natural environment. ▪ As part of the Environmental Awareness Training, all construction personnel should be made aware of the sewage management practices.	▪ Monitor the placement of sanitation facilities during the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Ensure that a suitable Contractor is appointed to remove and dispose the sewage at an appropriate, licensed facility. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Weekly ▪ During construction ▪ Weekly ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ ECO ▪ ECO ▪ ECO and Contractor ▪ ECO
Pollution of the surrounding environment	Reduce environmental impacts such as soil,	▪ Hazardous waste (i.e. empty tins, oils, fuel spillages, spilled materials and	▪ Monitor the strategic placement of the temporary,	▪ Once-off prior to the	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
as a result of the handling, temporary stockpiling and disposal of hazardous waste.	surface water and groundwater contamination as a result of incorrect storage, handling and disposal of hazardous waste.	chemicals etc.) generated during the construction phase should be stockpiled temporarily (i.e. once-off) on site in a designated area in suitable waste collection bins and leak-proof storage skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Hazardous waste must be stored separately from all other general waste. The designated stockpiling area must be labelled correctly.	designated waste stockpiling area at the site camp via visual inspections, and record and report any non-compliance. ▪ Monitor the temporary storage and handling of hazardous waste on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area).	commencement of the construction phase and as required as the construction process evolves. ▪ Daily	▪ ECO
		▪ Should the on-site stockpiling of hazardous waste exceed 80 m^3 for a period exceeding 90 days, then the National Norms and Standards for the Storage of Waste promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and (published on 29 November 2013 under GN 926) must be adhered to. ▪ Although the temporary storage of hazardous below the mentioned threshold is not regulated, section 28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") would apply.	▪ Record the amount of hazardous waste that is temporarily stockpiled at the designated area on site, as well as the duration and record non-compliance and incidents. ▪ Monitor the duration and amounts of hazardous waste that is temporarily stockpiled at the designated area on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area). ▪ Audit compliance with the Norms and Standards for the	▪ Daily ▪ Weekly ▪ Monthly	▪ Contractor ▪ ECO ▪ Project Developer ▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			Storage of Waste (published on 29 November 2013 under GN 926) if the storage amounts are exceeded (i.e. only if required).		
		▪ Ensure that the designated stockpiling area for hazardous waste (i.e. leak proof skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events.	▪ Monitor the temporary, designated waste stockpiling area at the site camp, as well as the handling of hazardous waste on site via site audits and record non-compliance and incidents.	▪ Daily	▪ ECO ▪ Environmental Manager
		▪ Ensure that all hazardous waste is removed from the site on a regular basis, and safely disposed at an appropriate, licensed hazardous waste disposal facility by an approved waste management Contractor.	▪ Ensure that a suitable Waste Management Contractor is appointed to remove and dispose the hazardous waste at an appropriate, licensed hazardous waste disposal facility. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Once-off prior to the construction phase. ▪ Weekly	▪ Contractor ▪ ECO ▪ Environmental Manager
		▪ Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.	▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Daily ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ ECO and Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means.	▪ Waste removal and disposal to be monitored throughout construction	▪ Weekly or bi-weekly	▪ ECO and Contractor
		▪ Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages.	▪ Waste removal and disposal to be monitored throughout construction	▪ Weekly or bi-weekly	▪ ECO and Contractor
		▪ Waste water from construction and painting activities must be collected in a designated container and disposed of at a suitable disposal point off site.	▪ Waste removal and disposal to be monitored throughout construction	▪ Weekly or bi-weekly	▪ ECO and Contractor
		▪ Control and implement waste management plans provided by contractors. Ensure that relevant legislative requirements are respected.	▪ Control of waste management practices throughout construction phase.	▪ Weekly or bi-weekly	▪ ECO and Contractor
C. OPERATIONAL PHASE					
C.1. TERRESTRIAL ECOLOGY IMPACTS					
Clearance of vegetation.	Minimize disturbance and clearance of vegetation.	▪ Restrict driving to designated roads.	▪ Ensure that mitigation measures are enforced.	▪ Every six months	▪ The ECO should monitor and report to the Holder of the EA.
Impact on animal behavior.	Avoid or minimize impacts that could potentially affect animal behavior.	▪ Restrict night driving during operational phase. ▪ Proper waste management procedures should be put in place. ▪ Ensure electrical fences are maintained according to standards of Nature Conservation Authorities.	▪ Ensure compliance with these mitigation measures.	▪ Every six months	▪ The ECO should monitor and report to the Holder of the EA.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Appropriate lighting to be installed in construction camp.			
Illegal collecting of animals/plants.	Avoid loss of SCC through illegal collecting.	▪ Ensure proper access control.	▪ Implement proper site access control.	▪ Every six months	▪ The ECO should monitor and report to the Holder of the EA.
Alien species invasion.	Avoid invasion by alien species.	▪ Implement a monitoring program for the early detection of alien invasive plant species and a control program to combat declared alien invasive plant species should be employed.	▪ Ensure implementation of a control programme to combat alien invasive plants (see .	▪ Every six months	▪ The ECO should monitor and report to the Holder of the EA.
C.2. BIRDS					
Fatalities due to collision.	Prevent mortality of sensitive bird species due to collision with wind turbines and associated infrastructures.	▪ Implement an operational phase avifaunal monitoring programme, in full compliance with the relevant Best Practice Guidelines, considering the following aspects: ▪ During the first two years of the projects' operational phase: o Monitoring campaign mirroring as a minimum, that conducted by Bioinsight during the pre-construction phase. o Carcass searches, searcher efficiency trials and scavenger removal trials.	▪ Implement an avifaunal monitoring programme in line with the most recent version of the Best Practice Guidelines that will be available at the time. ▪ Further operational mitigation measures to be researched during the operational monitoring campaign as an adaptive management approach. If significant levels of fatalities are observed in the opinion of the avifauna specialist,	▪ During the first two years of the projects' operational phase. Then in the fifth year, and every five years thereafter. ▪ During the operational phase of the project. ▪ During the operational	▪ Avifaunal specialist. ▪ Avifaunal specialist for monitoring. ▪ Holder of the EA for implement-tation. ▪ Holder of the EA, the DEA and Birdlife.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ In the fifth year of the operational phase, and every five years thereafter (for the entire lifespan of the project): o Carcass searches, searcher efficiency trials and scavenger removal trials. o Necessity for a monitoring campaign (or parts thereof) to be reviewed after completion of the second operational monitoring year, and then again after the fifth year, and every five years thereafter. ▪ If post-construction monitoring reveals significant unexpected impacts on birds that requires additional mitigation measures to be implemented then these mitigation measures will be determined and agreed upon between the holder of the EA, the DEA and Birdlife. ▪ Further operational mitigation measures to be researched during the operational monitoring campaign.	then these measures should be implemented. Such measures could include (but not limited to) shut-down on demand technology, habitat management, or bird deterrence systems. ▪ Regardless, according to IFC (2012) and BBOP (2012), if mitigation strategies are required, then all stakeholders (including, but not limited to: Birdlife South Africa, DEA, developer, landowners etc.) are to be consulted accordingly, in order to make decisions on thresholds and the types of mitigation measures. Additionally, as soon as these issues are identified, the mitigation strategies should be written into the EMPr for the developer to comply with, irrespective of cost. ▪ Further mitigation measures to be determined and implemented if post-construction monitoring reveals significant unexpected impacts on birds.	phase of the project	

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Disturbance effects.	Avoid disturbance of bird community due to the increase of people and vehicles in the area.	▪ Minimise general on-site disturbances. ▪ No off-road driving. ▪ Implement speed limits.	▪ Reduce noise levels as far as possible. ▪ Driving should, at all times, remain on existing roads. ▪ Speed limits should be implemented for driving, and should not exceed 40km/h.	▪ Minimise disturbances throughout the operational phase. ▪ No off-road driving throughout the operational phase. ▪ Speed limits to be implemented throughout the operational phase.	▪ All on-site personnel. ▪ All on-site personnel. ▪ All on-site personnel, and monitored by the facility manager.
Displacement effects.	Minimise displacement effects of the bird community due to on-site disturbances.	▪ Minimise on-site disturbances.	▪ Reduce noise levels as far as possible.	▪ During the operational phase.	▪ Operational staff to adhere. Facility Manger to oversee.
Bird Population Decline.	Reduce the risk of bird population decline within the area.	▪ Implement an operational monitoring programme with carcass searches, searcher efficiency trials and scavenger removal trials, to gain a better understanding of real impacts occurring on the avifaunal community. ▪ Further operational mitigation measures to be researched and implemented (as	▪ Conduct a monitoring campaign (with carcass searches, searcher efficiency trials and scavenger removal trials) during the first two years of the projects' operational phase. Then again in the fifth year, and every five years thereafter. It	▪ During the first two years of the projects' operational phase. Then in the fifth year, and every five years thereafter.	▪ Avifaunal Specialist. ▪ Avifaunal specialist for monitoring. ▪ Holder of the EA for implementation.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		required) during the operational monitoring campaign. ▪ Avoid turbine placement in very high sensitive areas. ▪ Bird habitats should not be severely destroyed, particularly in sensitive areas.	is only necessary to conduct the relevant carcass searches and trials after the completion of the second operational year. Further monitoring can, however, be recommended during later stages – if deemed relevant by the avifaunal specialist. ▪ Further operational mitigation measures to be researched during the operational monitoring campaign as an adaptive management approach. If significant levels of fatalities are observed in the opinion of the avifauna specialist, then these measures should be implemented. Such measures could include shut-down on demand technology, habitat management, or bird deterrence systems.	▪ During the operational phase.	
C.3. BATS					
Fatality events.	Avoid fatality of individuals due to collision with turbine blades or barotrauma caused by turbines operation.	▪ If turbines are to be lit at night, lighting should be kept to a minimum; ▪ Lighting of wind energy facility (for example security lights) should be kept to a minimum and should be directed	▪ Develop and implement a bat monitoring programme in line with the most recent version of the Best Practice	▪ During the first two years of the projects' operational phase.	▪ Bat specialist. ▪ Bat specialist for monitoring.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		downwards (with the exception of aviation security lighting); ▪ Appoint a bat specialist to develop and a post-construction monitoring programme (operation phase) to survey bat communities on the wind energy facility and the impacts resulting from the installed infrastructure, according to the Best Practice Guidelines available at that time; ▪ The results of the operational phase monitoring programme must be taken into account for the implementation of further mitigation measures, if necessary.	Guidelines that will be available at the time. ▪ Further operational mitigation measures to be researched during the operational monitoring campaign as an adaptive management approach, if required. If significant levels of fatalities are observed, then these measures should be implemented. Such measures could include curtailment, shut-down on demand technology, habitat management, or bat deterrence systems.	▪ During the operational phase of the project.	▪ Holder of the EA to implement.
Disturbance Effects.	Avoid disturbance of bat community due to noise and movement generated by turbines operation.	▪ Minimise general on-site disturbances. ▪ No off-road driving. ▪ Implement speed limits.	▪ Reduce noise levels as far as possible. ▪ Driving should, at all times, remain on existing or new roads. ▪ Avoid maintenance activities during the night and disturbance of roosts.	▪ Minimise disturbances throughout the operational phase. ▪ No off-road driving throughout the operational phase.	▪ All on-site personnel. ▪ All on-site personnel and monitored by the facility manager.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Displacement Effects.	Minimise displacement effects of the bat community due to on-site disturbances.	▪ Minimise on-site disturbances.	▪ Reduce noise levels as far as possible. ▪ Avoid maintenance activities during the night and disturbance of roosts.	▪ During the operational phase.	▪ Operational staff to adhere ▪ Facility Manger to oversee.
Population Decline.	Reduce the risk of population decline within the area.	▪ Appoint a bat specialist to develop and implement an operational monitoring programme with carcass searches, searcher efficiency trials and scavenger removal trials, to gain a better understanding of real impacts occurring on the bat community. ▪ Further operational mitigation measures to be researched during the operational monitoring campaign and implemented, if needed.	▪ Conduct a monitoring campaign (with carcass searches, searcher efficiency trials and scavenger removal trials) during the first two years of the projects' operational phase. Further monitoring can, however, be recommended during later stages – if deemed relevant by the bat specialist. ▪ Further operational mitigation measures to be researched during the operational monitoring campaign as an adaptive management approach. If significant levels of fatalities are observed, then these measures should be implemented. Such measures could include curtailment, shut-down on demand technology, habitat	▪ During the first two years of the projects' operational phase. ▪ During the operational phase.	▪ Bat specialist for monitoring. ▪ Holder of EA for implementation.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			management, or bat deterrence systems.		
C.4. FRESHWATER IMPACTS					
▪ Disturbance to soils and ongoing erosion as a result of periodic maintenance activities; and ▪ Altered water quality (if surface water is present) as a result of increased availability of pollutants ▪ Concentrated runoff from the road crossings leading to erosion and subsequent sedimentation of the watercourses (increase in the sediment load) and turbulent flows when surface water is present; ▪ Higher flood peaks into the watercourses due to reduced surface roughness in the watercourses.	▪ Limit the disturbance of aquatic habitat. ▪ Minimise potential to modify flow / hydraulics related impacts and increase the potential for erosion. ▪ Control of invasive alien plants in riparian zones and wetland areas. ▪ Limit potential for contamination/pollution of aquatic ecosystems. ▪ Limit alternation of water quality (if surface water is present) as a result of increased availability of pollutants. ▪ Limit sedimentation of the watercourses (increase in the sediment load). ▪ Limit higher flood peaks into the watercourses due to	▪ No indiscriminate movement of construction equipment through the watercourses may be permitted during standard operational activities or maintenance activities. Use must be made of the existing watercourse crossings only; ▪ Unnecessary disturbances surrounding the perimeter of the surface infrastructure must be avoided; ▪ Vehicles used in the development site must be regularly washed (on a non-permeable surface or off-site) to avoid the dispersal of seeds on any alien or invasive species into the watercourses; ▪ Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to monitor any build-up of debris that will impact on structure integrity or lead to erosion and sedimentation. Furthermore, monitoring to determine the establishment of indigenous vegetation and the presence of any alien or invasive plant species; ▪ The surface infrastructure areas must be inspected to ensure that no concentrated runoff from these areas form erosion gullies leading to erosion	▪ Ongoing monitoring of invasive alien plants within the site should be undertaken according to an approved plan ▪ Once the construction activities have ceased, the frequency of the monitoring can be reduced.	▪ Ongoing during operation	▪ Project Proponent ▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	reduced surface roughness in the watercourses	and sedimentation of receiving watercourses. Should these impacts be noted, these gullies/preferential flow paths must be infilled with in situ material and appropriately stabilised and/or revegetated; and ▪ Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically at the road crossings and surface infrastructures. Should alien and invasive plant species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation ▪ Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events; ▪ Stormwater runoff from the road crossings should be monitored (by the Operation and Maintenance (O&M) Manager), to ensure it does not result in erosion of the watercourses. Stormwater should be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		in the watercourse (through vegetation and rocky areas); ▪ Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the watercourses may be permitted; ▪ During periodic maintenance activities of the roads/surface infrastructure, monitoring for erosion should be undertaken; and ▪ Should erosion be observed, caused by the road crossings/instream infrastructure, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation. Use can also be made of rocks collected from the surrounding area to infill any area prone to erosion, as a natural dispersal mechanism.			
C.5. VISUAL IMPACTS					
Potential visual intrusion of the proposed WEF (turbines) on the views of sensitive visual receptors (skyline and open landscape).	Reduce visual intrusion of the WEF on the views of sensitive visual receptors as well as its impact on the surrounding landscape.	▪ Turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). ▪ If required, turbines should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can result in unity and lessen the visual impact that would typically be experienced in a chaotic landscape	▪ Carry out visual inspections during site audits to verify if all blades are in working condition and report and replace ones which are not operational. ▪ Carry out visual inspections to monitor the effectiveness of the dust suppression techniques and report non-compliance.	▪ Weekly ▪ Monthly	▪ Facility Manager ▪ Holder of the EA.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		made up of diverse colours, textures and patterns (Vissering, 2011). ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads where practically possible, the operations and maintenance buildings should not be illuminated at night.			
Potential impact of night lighting of the proposed WEF on the nightscape of the region.	Reduce the impact of night lighting of the proposed WEF on the surrounding nightscape and sensitive visual receptors.	▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Use non-reflective lights on turbines.	▪ Complaints about night lights should be investigated and documented in a register.	▪ As complaints arise.	▪ Facility Manager ▪ Holder of the EA
C.6. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
Destruction of archaeological remains, graves and built environment features.	Avoid destruction of archaeological remains, graves and built environment features.	▪ Use existing roads for maintenance purposes. ▪ Keep all disturbance within development footprint.	▪ Carry out an inspection of WEF to ensure that existing roads are used for maintenance and disturbance are kept to development footprint.	▪ Monthly	▪ Holder of the EA ▪ Facility Manager
Loss of significance through erosion of visual qualities and integrity of cultural landscape.	Integrity of cultural landscape maintained.	▪ Keep site crew informed of heritage sensitivity of landscape. ▪ Keep vulnerable sites cordoned off as no-go areas.	▪ Carry out visual inspections to ensure strict control over the behaviour of operational staff to ensure that activities	▪ Monthly	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Destruction of archaeological remains, graves and built environment.	Minimise the chances archaeological remains, graves and built environment being disturbed.		do not take place outside of authorized operational footprint.		
Impacts to the cultural landscape.	Reduce the impact on cultural landscape.	▪ Impact of the proposed WEF on local inhabitants (of permanent and seasonal habitation, owners and labourers) should be monitored by the Holder of the EA. ▪ Set up a complaints register/grievance mechanism to allow any potentially negatively affected party to raise its concerns, which are then assessed and resolved.	▪ A complaints register must be available on site at all time to any individual who may have a complaint. These complaints must be noted and suitable action taken to address the complaint. ▪ All landowners will be provided with contact details where they can lodge grievances. ▪ The holder of the EA will keep a register of all the complaints/grievances lodged. ▪ Feedback on all complaints will be provided within 10 days.	▪ Through-out the operation and decommissioning phases.	▪ Holder of the EA. ▪ Facility Manager
C.7. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					
Erosion due to the operation of the proposed Kudusberg WEF.	No erosion on or downstream of the site due to the disturbance and existence of hard surfaces.	▪ Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	▪ Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off	▪ Bi-annually	▪ Facility Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			control system in the event of any erosion occurring.		
C.8. SOCIO-ECONOMIC IMPACTS					
Negative socio-economic impacts	Negative socio-economic impacts to be addressed.	▪ Set up a complaints register/grievance mechanism to allow any potentially negatively affected party to raise its concerns, which are then assessed and resolved.	▪ A complaints register/grievance mechanism must be available on site at all time to any individual who may have a complaint. These complaints must be noted and suitable action taken to address the complaint. ▪ All landowners will be provided with contact details where they can lodge grievances. ▪ The holder of the EA will keep a register of all the complaints/grievances lodged. ▪ Feedback on all complaints will be provided within 10 days.	▪ Grievance mechanism to be in place through-out the operation of the WEF. ▪ Feedback on complaints will be provided within 10 days.	▪ Holder of the EA ▪ Facility Manager
C.9. NOISE IMPACTS					
Reduce operational noise.	Noise at NSAs not to exceed requirements of SANS 10103.	▪ Confirm the noise impact by conducting monitoring.	▪ As per the requirements of SANS 10103	▪ Ambient noise monitoring to be conducted on site at the NSA closest to a wind turbine	▪ Specialist noise consultant

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
				when operations commence to verify the noise emissions meet the noise rating limit. Mitigation measures to be implemented if the noise impact exceeds the 35dB(A) noise rating limit. ▪ No further noise monitoring to be conducted if noise complaints are not received.	
C.10. WASTE MANAGEMENT					
Pollution of the surrounding environment as a result of the handling, temporary storage and disposal of solid waste (general and hazardous).	Reduce soil and groundwater contamination as a result of incorrect storage, handling and disposal of general and hazardous waste.	▪ Sufficient waste collection bins and skips (or similar) should be provided at the WEF. Waste collection bins and skips should be covered with suitable material and correctly labelled, and should be kept in a designated, demarcated area, where access control is monitored and managed.	▪ Monitor waste generation and collection throughout the operational phase.	▪ Weekly	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ Segregation of hazardous waste from general waste to be in place. Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types.	▪ On-site inspection of waste segregation. ▪ Control of waste management practices throughout operational phase.	▪ Weekly ▪ Weekly	▪ Facility Manager ▪ Facility Manager
		▪ General waste and hazardous waste should be removed from the site on a regular basis and disposed of at an appropriate, licensed waste disposal facility. Hazardous waste should be removed by an approved waste management Contractor. General solid waste could be removed from the site by municipal services or suitable contractor. Waste disposal slips or waybills (waste disposal certificates) should be kept on file for auditing purposes as proof of disposal, for a minimum of 5 years.	▪ Inspection of the waste storage area. ▪ Monitor via site audits and record non-compliance and incidents. Facility Manager to monitor and audit disposal slips.	▪ Daily ▪ Monthly	▪ Facility Manager
		▪ Ensure that the WEF is kept clean at all times and that operational personnel are made aware of correct waste disposal methods.	▪ Conduct training for all operational personnel. ▪ Monitor the state of WEF via site audits and record non-compliance and incidents.	▪ Once-off during operations and ensure that all new staff are inducted. ▪ Daily	▪ Facility Manager
		▪ No solid waste may be burned or buried on site.	▪ Monitor via site audits and record non-compliance and incidents.	▪ Daily	▪ Facility Manager
		▪ Waste amounts shall be recorded on a monthly basis.	▪ Waste amounts to be documented.	▪ Monthly	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		▪ All operational waste (concrete, steel, rubbles etc.) to be removed from the site and waste hierarchy of prevention, as the preferred option, followed by reuse, recycling, and recovery must be implemented, where possible.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		▪ Other non-hazardous solid waste (e.g. packaging material) to be disposed of at a licensed landfill.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		▪ All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		▪ Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		▪ Waste water from operations and painting activities must be collected in a designated container and disposed of at a suitable disposal point off site.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
D. DECOMMISSIONING PHASE					
D.1. ECOLOGICAL IMPACTS (Terrestrial fauna and flora)					
Clearance of vegetation.	Minimize disturbance and clearance of vegetation.	▪ Restrict driving to designated roads. ▪ No new roads to be built. ▪ Decommissioning camp to be located at the construction camp site. ▪ Any areas that will be denuded as a result of activities on site, should be re-vegetated (rehabilitated) as soon as possible to prevent soil erosion and	▪ Ensure that mitigation measures are enforced.	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		establishment of alien invasive plant species. ▪ No alien species should be used in landscaping or rehabilitation on the sites.			
Impact on animal behavior.	Avoid or minimize impacts that could potentially affect animal behaviour.	▪ No night driving during decommissioning phase. ▪ Proper waste management procedures should be put in place. ▪ All material brought in for the development should be removed.	▪ Ensure compliance with these mitigation measures.	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.
Increased dust levels.	Avoid or minimize increased dust levels.	▪ Dust control measures should be implemented.	▪ Ensure that dust control measures are in place.	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.
Alien species Invasion.	Avoid invasion by alien species.	▪ Implement a monitoring program for the early detection of alien invasive plant species and a control program to combat declared alien invasive plant	▪ Ensure implementation of a control programme to combat alien invasive plants.	▪ Every three months	▪ The ECO should monitor and report to the Holder of the EA.
D.2. BIRDS					
Disturbance effects.	Avoid disturbance of bird community due to the increase of people and vehicles in the area.	▪ Minimise on-site disturbances.	▪ Minimise the presence of people and vehicles in very high sensitive areas, and reduce noise levels as far as possible.	▪ Minimise disturbances throughout the decommissionin g phase.	▪ All on-site personnel.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Displacement effects.	Minimise displacement effects of the bird community due to on-site disturbances.	▪ Minimise on-site disturbances.	▪ Minimise the presence of people and vehicles in very high sensitive areas, and reduce noise levels as far as possible.	▪ Minimise disturbances throughout the decommissioning phase.	▪ All on-site personnel.
D.3. BAT IMPACTS					
Disturbance/ Displacement Effects	Avoid disturbance and/or displacement of bat community due to noise and movement generated by the increase of people and vehicles in the area, for the dismantling of turbines and associated infrastructure.	▪ Minimise on-site disturbances.	▪ Adequate training should be provided to all the construction personnel. ▪ Everybody working in the area should be aware of the sensitive areas, be alert to the possible presence of bats, especially when working close to potential and/or confirmed roosts (per example abandoned buildings). ▪ Reduce noise levels as far as possible.	▪ Minimise disturbances throughout the decommissioning phase.	▪ All on-site personnel.
D.4. FRESHWATER ECOLOGY IMPACTS					
▪ Disturbance of soil and vegetation that established within the operational area.	▪ Limit the disturbance of aquatic habitat.	▪ No indiscriminate movement of construction equipment in the watercourses and buffer zones surrounding the watercourses may be permitted. Use must be made of the existing roads during the decommissioning phase; ▪ All surface infrastructure must be decommissioned. All materials must be	▪ Monitoring that no-go areas are adhered to should be undertaken on an ongoing basis for the duration of the decommission phase. ▪ Ongoing monitoring of implementation of method statements and rehabilitation measures	▪ Ongoing during decommissioning.	▪ Project Proponent/ ▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		removed from the watercourses (where applicable) and may temporarily be stockpiled outside the 32 m NEMA ZoR, where after is must be removed from site and disposed of at a registered disposal facility; ▪ High flood peaks from the decommissioning footprint areas can be mitigated by ensuring that no concentrated runoff from the surface infrastructure area and subsequent cleared area enters the watercourses. The velocity of surface water flow from these areas must be reduced by ensuring that the vegetation in the buffer area surrounding the watercourses are intact or by the strategic placement of silt traps of haybales as a means to obstruct flow but still allow flow to percolate at a reduced velocity and encourages a diffuse flow pattern. In this regard it is recommended at an alien and invasive plant species management plan be implemented during the construction and operational phases to specifically prevent the spread of any such species into the sensitive ecological areas; ▪ Areas where surface infrastructure have been decommissioned and removed must be suitably compacted/ripped and revegetated to ensure that no erosion	should be undertaken in the decommission phase. ▪ Ongoing monitoring of invasive alien plants within the site should be undertaken according to an approved plan		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		occurs which may contribute to the sediment load of the watercourses; ▪ Should erosion gullies be noted, these areas must be rehabilitated by infilling them with suitable soil and ensuring the area is vegetated. The increased surface roughness will discourage concentrated flow paths to develop and ensure diffuse flow patterns; ▪ Should road crossings be decommissioned, road footprint areas within the watercourse must be levelled to the same level and shape as that of the upstream and downstream reaches. This will ensure a continuous bed level and prevent any concentration of surface flow from occurring; ▪ Watercourse embankments must be suitably rehabilitated (shaped end revegetated) to prevent any erosion from occurring; ▪ All bare areas in the project area, specifically where vegetation was initially cleared for surface infrastructure components) must be ripped and be revegetated within suitable indigenous vegetation species; ▪ Follow up revegetation should take place in areas where initial revegetation is not successful; ▪ It is recommended that a Watercourse Rehabilitation and Management Plan			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		must be compiled and implemented. Implementation must be overseen by a suitably qualified Environmental Site Officer (ESO) and the ESO must sign off the rehabilitation before the relevant contractors leave site; and ▪ Post-closure monitoring of the watercourses (for a period of 3 years), with specific mention of the invasion of alien vegetation species) is recommended to be undertaken..			
D.5. VISUAL IMPACTS					
Potential visual intrusion of decommissioning activities (removal of WEF structures) on existing views of sensitive visual receptors.	Prevent unnecessary visual clutter during the decommissioning phase and focusing attention of surrounding visual receptors on the proposed development.	▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Make use of existing gravel access roads where possible. ▪ Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads. ▪ Maintain a neat construction site.	▪ Conduct visual inspections to ensure that landscaping is following the rehabilitation plan. ▪ Monitor if mitigation measures are implemented.	▪ Weekly	▪ ECO ▪ Contractor
Visual impacts of remaining roads, platforms and concrete slabs.					
D.6. HERITAGE IMPACTS (ARCHAEOLOGY, PALAEONTOLOGY AND CULTURAL LANDSCAPE)					
Vehicles and activities associated with the removal of the WEF and rehabilitation of site could result in damage to or destruction of	Avoid or minimise the chances of significant archaeological sites and/or graves being disturbed.	▪ Ensure that no activity takes place outside of the authorized footprint. ▪ Report any chance finds of fossils or palaeontological resources. ▪ Ensure excavation and sampling of affected archaeological sites.	▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities within demarcated areas.	▪ Weekly ▪ Ongoing during decommissioning phase.	▪ ECO ▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
archaeological sites and/or graves.		▪ Report any chance finds of graves.	▪ Demarcate graveyards in the south-east and monitor that this area is avoided by workers during the decommissioning phase.		
Loss of significance through erosion of visual qualities and integrity of cultural landscape.	Integrity of cultural landscape maintained.	▪ Keep site crew informed of heritage sensitivity of landscape. ▪ Keep vulnerable sites cordoned off as no-go areas.	▪ Carry out visual inspections to ensure strict control over the behaviour of decommissioning staff to ensure that activities do not take place outside of authorized operational footprint.	▪ Ongoing during decommissioning	▪ ECO ▪ Contractor
D.7. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					
Erosion caused by the decommissioning of the proposed Kudusberg WEF.	No erosion on or downstream of the site due to the disturbance and existence of hard surfaces.	▪ Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	▪ Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	▪ Monthly	▪ ECO
D.8. NOISE IMPACTS					
Increase in ambient sound levels during decommissioning activities.	Reduce the increase in ambient sound levels due to air-borne noise from the decommissioning	▪ Staff to receive noise sensitivity training. ▪ Monitoring of noise. ▪ Limit high noise activities to daytime operations when possible, noting that decommissioning requirements might	▪ Monitor compliance with National Noise Control Regulations.	▪ Daily during the decommissioning phase	▪ Project Developer ▪ ECO ▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	activities during day and night	not allow this due to various factors e.g. Crane use optimization, weather conditions etc.			
D.9. TRAFFIC IMPACTS					
Dust and noise pollution.	Avoid or minimize impacts on road network.	▪ Dust suppression. ▪ Maintenance of gravel roads	▪ Regular monitoring of road surface quality.	▪ Before and during the decommissioning phase.	▪ Contractor
D.10. WASTE MANAGEMENT					
Generation of waste due to disassembly of the WEF and associated structures.	Avoid substantial negative impacts at the decommissioning phase due to insufficient planning.	▪ Suitable receptacles must be provided for the temporary storage of various waste types such as scrap metal and concrete, until it is removed to the nearest licensed landfill.	▪ Audit the implementation of mitigation measures recommended for the decommissioning phase.	▪ During the decommissioning phase	▪ ECO
		▪ Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types. ▪ Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.	▪ Audit the implementation of mitigation measures recommended for the decommissioning phase.	▪ During the decommissioning phase	▪ ECO

APPENDIX A – CVs:

APPENDIX A – CV: Minnelise Levendal – Project Leader (Environmental Assessment Practitioner)

CSIR
Jan Cilliers Street
PO Box 320
Stellenbosch 7599
South Africa

Phone: +27 21 888 2495/2661
Fax: +27 21 888 2693
Email: mlevendal@csir.co.za

Name of firm	CSIR
Name of staff	Minnelise Rouchelle-Ann Levendal
Profession	Environmental Assessment Practitioner/Project Manager
Position in firm	Senior Environmental Assessment Practitioner
Years' experience	17 years
Nationality	South African
Languages	Afrikaans and English
Licence	Code EB (22 years)

BIO-SKETCH:

Minnelise has been working in the Environmental Management sector for 17 years. She completed her BSc degree in Botany at the University of the Western Cape in 1994 and her Masters (MSc) in Botany at the University of Stellenbosch in 1998. After completing her Honours degree she lectured Mycology at the Peninsula Technicon (now known as the Cape Peninsula University of Technology (CPUT) in 1995. She then lectured Botany to second year students at the University of the Western Cape (UWC) in 1996.

Following the completion of her Masters Degree she was selected as one of 20 students from third world countries to attend a course on desertification in 1999 sponsored by the Shalom programme at the Ramon Science Center, Sede Boqer, Mitrani Department of Desert Ecology, Bengurion University of the Negev, Israel. After successfully completing the one-month course, she worked at the said institution as a research assistant for two months. The research she conducted led to the publication of an article that was published in the Journal of Arid Environments in 2004-see list of publications.

Following her studies and research work at the Bengurion University, she was appointed as an Environmental Officer at the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) in November 1999. Her work included commenting on Environmental Impact Assessments (EIAs), Basic Assessments (BAs) and Environmental Management Plans (EMPs) to ensure that environmental issues are adequately addressed in development applications. At DEA&DP she also worked in the Biodiversity unit to promote the mainstreaming of biodiversity issues into environmental decision-making, policies and planning. From 2003 until 2004 she was the secretary for the Interim Western Cape Coastal Coordinating Committee (IWCCC). She was also a member of the IAIA (Western Cape) steering committee from 2001 to 2002. At

DEA&DP she attended numerous courses on Environmental Management (including Environmental Law)-a full list of courses is available on request.

Minnelise is currently a Senior Environmental Assessment Practitioner (EAP) in the Environmental Management Services (EMS) Group at the Council for Scientific and Industrial Research (CSIR) in Stellenbosch. She joined the CSIR in 2004. Her current work entails managing EIAs and BAs to ensure that environmental criteria are adequately assessed in development applications, including monitoring and evaluation. She also prepares proposals and write reports.

She is currently managing various EIAs for renewable energy projects in South Africa, including wind and solar. She was the project manager for ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the Department of Energy. Environmental Authorisation for these 10 BAs were granted by the f national Department of Environmental Affairs (DEA) in 2010. She was the CSIR project manager for the 100 MW Ubuntu Wind Energy Facility near Jeffrey's Bay (Environmental Authorisation granted in June 2012), as well as the 50 MW Banna Ba Pifhu Wind Energy proposed by WKN Windcurrent near Humansdorp in the Eastern Cape (Environmental Facility Authorisation granted in July 2014). She also managed seven EIAs for seven solar Photovoltaic (PV) Facilities near Kenhardt for Mulilo Renewable Project Developments (2015-2016). She was the project leader for the Kap Vley Wind Energy Project near Kleinzee in the Northern Cape.

Minnelise recently managed the Special Needs and Skills Development Programme of DEA (2014-2018) which provided *pro bono* environmental services to applicants with special needs. This involves mentoring interns and Junior Environmental Assessment Practitioners.

In addition to the EIAs and BAs undertaken by Minnelise, she was also the Project Manager of other diverse projects to promote environmental management including *inter alia*:

- Biodiversity Management Plan for the African Lion (*Panthera leo*) (2014);
- Development of a National Management Plan and Strategy for Invasive Alien species (2014);
- South Africa's Second National Communication under the United Nations Framework Convention on Climate change (2010); and
- The development of protocols for the monitoring and evaluation of benefits arising from the Working for Water Programme (2008).

In undertaking these projects, Minnelise has developed a keen grasp of national and international sustainability issues which affect people and the environment. She has a good knowledge of environmental legislation and environmental management in general.

EDUCATION

▪ M.Sc. (Botany)	Stellenbosch University	1998
▪ B.Sc. (Hons.) (Botany)	University of the Western Cape	1994
▪ B.Sc. (Education)	University of the Western Cape	1993

PROFESSIONAL REGISTRATIONS / MEMBERSHIPS

- International Association for Impact Assessment (IAIA), Western Cape (member of their steering committee from 2001-2002).
- Professional Natural Scientist (Pr.Sci.Nat) – registration imminent)

EMPLOYMENT RECORD

Name of current employer	Position	From	To
CSIR (Environmental Management Services; Implementation Unit)	Senior Environmental Assessment Practitioner	2006	Present
CSIR (Natural Resources and the Environment)	Environmental Researcher	2004	2006
Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)	Assistant Director	2003	2004
	Principal Environmental Officer	2002	2003
	Principal Environmental Officer	2002	2003
	Senior Environmental Officer	2001	2002
	Environmental Officer	1999	2000
University of the Western Cape	Junior Lecturer	1996	1996
Cape Peninsula University of Technology (CPUT)	Junior Lecturer	1995	1995

KEY COURSES

- Public Participation in Environmental Authorisation in South Africa: IAIA workshop presented by Tisha Greyling and Erika Du Plessis (2016).
- Environmental Law: Shepstone Wylie Attorneys; Presented by Janice Tooley (2015).
- Sharpening the Tool: New techniques and methods in Environmental Impact Assessment: Sustainable Environmental Solutions (Pty) Ltd (2015).
- Effective Skills for Challenging Meetings & Engagements: Conflict Dynamics (2015).
- Science Communication and Working with the Media: Proof Communications/Jive Media Africa (2014).
- Leadership, Innovation and Change Management: University of Stellenbosch (Business School) (2013).
- MS Project: CILLA (2011).
- Project Management I and II: CILLA (2005)
- Social Impact Assessment: IAIA workshop (2002)
- Environmental Law ("The New Environmental Law Course for Environmental Managers): University of Potchefstroom: Center for Environmental Management) (2002).
- Implementing Environmental Management Systems (SABS/ISO 14001:1996): University of Potchefstroom: Center for Environmental Management (2002).
- Conflict Management in Environmental Issues: University of Potchefstroom: Center for Environmental Management) (2001).

PROJECT EXPERIENCE RECORD

The following table presents a list of key projects undertaken by Minnelise Levendal at the CSIR to date, as well as the role played in each project:

Environmental Impact Assessment (EIAs) and Basic Assessments (BAs)-including their respective Environmental Management Programmes (EMPRs):

Completion Date	Project description	Role	Client
Withdrawn by the applicant	EIA for the proposed Platberg Wind Energy Facility near Victoria West in the Northern Cape	Project Manager and EAP	South Africa Mainstream Renewable Power Developments (Pty) Ltd
Withdrawn by the applicant	EIA for the proposed Teekloof Wind Energy Facility near Victoria West in the Northern Cape	Project Manager and EAP	South Africa Mainstream Renewable Power Developments (Pty) Ltd
2015-2016	EIA for the Gemsbok Solar Photovoltaic, PV 3 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2015-2016	EIA for the Gemsbok Solar PV 4 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2015-2016	EIA for the Gemsbok Solar PV 5 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2015-2016	EIA for the Gemsbok Solar PV 6 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2015-2016	EIA for the Boven Solar PV 2 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2015-2016	EIA for the Boven Solar PV 3 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2015-2016	EIA for the Boven Solar PV 4 near Kenhardt in the Northern Cape	Project Manager and EAP	Mulilo Renewable Project Developments
2014-2018	Special Needs and Skills Development Programme	Project Manager	DEA
2010-2011 (EA Granted)	EIA for the proposed Ubuntu wind energy project, Eastern Cape	Project Manager	WKN Windkraft SA
2010-2011 (EA granted)	EIA for the proposed Banna Ba Pifhu wind energy project, Eastern Cape	Project Manager	WKN Windkraft SA
2010-2011 (EA granted)	BA for a powerline for a WEF near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010-2011 (EA Granted)	EIA for a proposed Excelsior wind farm near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (EAs granted)	Basic Assessment for the erection of two wind monitoring masts near Swellendam and Bredasdorp in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (EA granted)	Basic Assessment for the erection of two wind monitoring masts near Jeffrey's Bay in the Eastern Cape	Project Manager	Windcurrent (Pty Ltd

Completion Date	Project description	Role	Client
2009-2010 (EAs granted)	Basic Assessment Process for the proposed erection of 10 wind monitoring masts in SA as part of the national wind atlas project	Project Manager	Department of Energy through SANERI; GEF
2009 (EAs granted)	Basic Assessment Report for a proposed boundary wall at the Port of Port Elizabeth, Eastern Cape	Project Manager	Transnet Ltd
Other Environmental Assessments, Strategies, Biodiversity Management Plans, Frameworks and Reporting tools:			
2012-2014	Development of a Biodiversity Management Plan for the African Lion (*Panthera leo*)	Project Manager	DEA
2010	South Africa's Second National Communication under the United Nations Framework Convention on Climate Change	Project Manager	SANBI
2006-2008	Monitoring and Evaluation of aspects of Biodiversity	Project Leader	Internal project awarded through the Young Researchers Fund
2006	Integrated veldfire management in South Africa. An assessment of current conditions and future approaches.	Co- author	Working on Fire
2004-2005	Biodiversity Strategy and Action Plan Wild Coast, Eastern Cape, SA	Co-author	Wilderness Foundation
2005	Western Cape State of the Environment Report: Biodiversity section. (Year One).	Co- author and Project Manager	Department of Environmental Affairs and Development Planning

AWARDS

- 2008: Best presentation Award at Arid Zone Conference (Northern Cape)
- 2015: CSIR award for Human Capital Development: Special Needs and Skills Development Programme

CONFERENCE PRESENTATIONS & PAPERS

- **Levendal, M**. (2012). "Challenges in the Environmental Assessment of Renewable Energy Projects in South Africa" In IAIA (Portugal) Conference Proceedings.
- **Bowie, M.** (néé Levendal) (1998). "Ecophysiological responses of four succulent Karoo species under different temperature and water regimes." In *Arid Zone Conference (Northern Cape) Conference Proceedings*.

PUBLICATIONS

- **Bowie, M.** (néé Levendal) and Ward, D. (2004). Water status of the mistletoe Plicosepalus acaciae parasitic on isolated Negev Desert populations of Acacia raddiana differing in level of mortality. Journal of Arid Environments 56: 487-508.
- Wand, S.J.E., Esler, K.J. and **Bowie, M.R** (2001). Seasonal photosynthetic temperature responses and changes in 13C under varying temperature regimes in leaf-succulent and drought-deciduous shrubs from the Succulent Karoo, South Africa. South African Journal of Botany 67:235-243.
- **Bowie, M.R.,** Wand, S.J.E. and Esler, K.J. (2000). Seasonal gas exchange responses under three different temperature treatments in a leaf-succulent and a drought-deciduous shrub from the Succulent Karoo. South African Journal of Botany 66:118-123.

LANGUAGE CAPABILITY

Language	*Speaking*	*Reading*	*Writing*
English	*Excellent*	*Excellent*	*Excellent*
Afrikaans	*Excellent*	*Excellent*	*Excellent*

REFERENCES

Mr Henri Fortuin
Director: Land Management: Department of Environmental Affairs & Development Planning; Western Cape (DEA&DP); (ex-colleague at CSIR)
Tel: 021 483 2787 / 083 226 9127
Email: henri.fortuin@westerncape.gov.za

Mr Patrick Morant
Independent (Private) Consultant
Tel: 021 888 2480
Cell: 076 266 033
Email: pmorant@csir.co.za

Minnelise Levendal

November 2018

CURRICULUM VITAE

Liandra Scott-Shaw

Name	Liandra Scott-Shaw (neé Bertolli)
Profession	Environmental Scientist
Name of Firm	SiVEST SA (Pty) Ltd
Present Appointment	Environmental Consultant
Years with Firm	5 Years
Date of Birth	08 March 1986
Nationality	South African
ID No.	8603080022083

Education

- Matric Exemption (Natal Education Department) Durban Girls High School (2002-2003)

Professional Qualifications

- Bachelor of Science (Biological Science): University of KwaZulu-Natal, 2008
- Bachelor of Science (Honours) Ecological Science: University of KwaZulu-Natal, 2009
- Pr.Sci.Nat. Registration No. 117442

Membership to Professional Societies

- South African Council for Natural Scientific Professions (SACNASP)
- Royal Society of South Africa 2010-Present
- International Association for Impact Assessment South Africa (IAIAsa)

Employment Record

Jan 2014 - date	SiVEST SA (PTY) LTD – Environmental Division: Environmental Consultant
Jun 2013 - Dec 2013	ECO-PULSE Environmental Consulting Services - Internship
Jan 2010 - Jan 2013	University of the North West (Diatom collection, process and analysis)
Jan 2012 - Dec 2012	John Bews Herbarium, (Geo referencing specimen)
Feb 2006 - June 2013	University of KwaZulu-Natal (Laboratory and field assistant for the School of Biological and Conservation Science, Demonstrating and Lecturing in Biology and Biogeography)

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent
Afrikaans	Basic	Basic	Basic

Years of Working Experience: 6

Countries of Work Experience

- South Africa

CURRICULUM VITAE

Liandra Scott-Shaw

Field of Specialisation

- Plant biodiversity assessments
- Alien plant identification/management
- Diatom diversity assessments
- Field identification
- Taxonomical background
- Report writing
- NEMA and NEM:BA regulations and policies

Overview

Liandra has completed a Bachelor of Science Degree in Biological Science (University of KwaZulu-Natal, PMB), a Bachelor of Science (Honours) in Ecological Science (University of KwaZulu-Natal, PMB) and is completing her Master of Science Degree in Environmental Science (University of KwaZulu-Natal, PMB), of which the focus is on Diatoms as indicators of wetland water quality in the KZN Midlands.

Liandra has been involved in consulting since 2013, which included biodiversity assessments and analyses as well as report writing. Prior to that, Liandra had been involved in academic research and demonstrating/lecturing since 2008.

Projects Experience (by Sector)

VEGETATION ASSESSMENTS, REHABILITATION PLANS AND PERMIT APPLICATIONS

- Ntunjambili Bulk Water Supply Scheme
- Eshowe SSA1 Pipeline Project
- Bishopstowe Development Area
- Dube TradePort State of Environment Report
- Transnet Richards Bay Port Development Vegetation Assessment
- Transnet South Dune Vegetation Assessment
- Umsunduzi Greater Edendale Environmental Management Framework
- Sumitomo Rubber Manufacturing Plant Vegetation Assessments, Alien Plant Management Plan And Plant Permits
- Umgeni Water Darvill Constructed Wetland Vegetation Assessment
- P75-2 Road Upgrade Vegetation Assessment
- Masinege Sewer Line Vegetation Permits
- Tongaat Hulett Cornubia North Development Vegetation Assessment
- Tongaat Hulett Lindokuhle Housing Development Vegetation Assessment
- Tongaat Hulett Simhlangentsha Pipeline Vegetation Assessment
- Tongaat Hulett Dudley Pringle Development Vegetation Assessment
- Tongaat Hulett Maidstone Mill Development Vegetation Assessment
- Arcelor Mittal Newcastle Works Alien Plant Management Plan
- Umgeni Water Umshawathi Pipeline Vegetation Assessment
- ACSA GCS Diatom Sampling
- Mandeni Cemetery Vegetation Assessment
- Fountain Hill Development Vegetation Assessment
- Salt Rock Development Vegetation Assessment
- Colenso Coal Project
- Strode Property Development Vegetation Assessment
- Tongaat Hulett Tinley Manor South Wetland Assessment (vegetation)
- Tongaat Hulett Tinley Manor North Wetland Assessment (vegetation)
- Umgeni Water South Coast Pipeline Vegetation Assessment, Plant Permits
- Swayimane Bulk Water Pipeline
- Westbrook Club Development Vegetation Assessment
- Eskom Candover – Mbazwana Vegetation Assessment and Plant Permits

- Eskom Eshowe Electrification Vegetation Assessment and Plant permits
- Eskom Empangeni Electrification Vegetation Assessment and Plant permits
- Eskom Jozini Electrification Vegetation Assessment and Plant permits
- Eskom Electrification Vegetation Assessment and Plant permits
- Eskom Nsele Godi Electrification Vegetation Assessment and Plant permits
- Eskom Makhatini Electrification Vegetation Assessment and Plant permits
- Eskom Esicabazeni Electrification Vegetation Assessment and Plant permits
- Ethekwini Hammarsdale Electrification Vegetation Assessment
- Shemula Pipeline Vegetation Assessment and Plant permits
- Ezakheni Housing Vegetation Assessment
- Ashton College Vegetation Assessment
- eThekwini Metropolitan Marianridge Housing Development Vegetation Assessment
- Edendale Town Centre Development Vegetation Assessment
- N2 Pongola Ecological Studies Vegetation Assessment
- Sani Pass Hotel Upgrades Vegetation Assessment
- Eskom Lake Eland Vegetation Assessment and Plant permits
- Eskom Phungashe Phase 3 Vegetation Assessment and Plant permits
- Eskom Bhanbanani Vegetation Assessment and Plant permits
- Eskom Sunduza Vegetation Assessment and Plant permits
- Eskom TC Xumalo Vegetation Assessment and Plant permits
- Eskom Cwakeme Vegetation Assessment and Plant permits
- Eskom Mambane Vegetation Assessment and Plant permits
- Eskom Nkangala Vegetation Assessment and Plant permits
- Eskom Estcourt Permits Vegetation Assessment and Plant permits
- Eskom Emahusheni Permits Vegetation Assessment and Plant permits
- Eskom Mamfene Permits Vegetation Assessment and Plant permits
- Eskom Qwabe Permits Vegetation Assessment and Plant permits
- Eskom BA Khumalo Permits Vegetation Assessment and Plant permits
- Eskom Zululand Melmoth Vegetation Assessment and Plant permits
- Eskom Muller Helgardt Permits Vegetation Assessment and Plant permits
- Eskom Zamazama Permits Vegetation Assessment and Plant permits
- World Tomorrow Fund South Bank Permits Vegetation Assessment and Plant permits

ENVIROMENTAL CONTROL OFFICER

- Eskom Candover-Mbazwana Powerline
- Lombardskop Pipeline
- Zimbali Lakes Golf Course
- Fitty Park Water Pipeline
- Driefontein Phase 1 Water Pipeline
- Middledrift SSA5 Water Pipeline
- Lower Tugela Bulk Water Off-take 12
- Lower Tugela Bulk Water Off-take 10
- Lower Tugela Bulk Water Off-take 1
- Lower Tugela Bulk Water Off-take 11
- Mpumulanga Unit G Development
- Maphumulo (Invutshane Dam) Phase 2 Pipeline

BASIC ASSESSMENTS / ENVIRONMENTAL IMPACT ASSESSMENTS

- La Mercy Integrated Human Settlement Development
- Waterval Prison Upgrade Project
- Greater Kokstad Bulk Raw Water Upgrade Project
- Dube TradePort Agrizone 2
- D1562 Road Upgrade BA
- Mthandeni Irrigation Extension Project
- Shemula Bulk Raw Water Phases 2 - 6 BA
- Izinga Phase 3 BA

- Zimbali Estate Properties BA
- Cornubia Portion 14 Petrol Filling Station
- South Coast Pipeline BA
- Swayimane Bulk Water BA
- Mswhathi Pipeline (Amendment)
- Compensation Organic Waste Facility
- Sumitomo Rubber Manufacturing Plant
- Darvill Constructed Wetland
- Dube Tradeport Agrizone 2
- Chansbury Poultry Farm

STRATEGIC PROJECTS

- Greater Edendale Area EMF
- Bishopstowe Development Area SEA
- Ray Nkonyeni Municipality SEA
- Dube TradePort State of Environment Report (SoER)

MANAGEMENT PLANS

- Phinda Private Game Reserve Maintenance Management Plan

Academic Contributions

Lang P, Taylor J, Bertolli L, Lowe S, Dallas H, Kennedy MP, Gibbins C, Sichingabula H, Saili, Day J, Willems F, Briggs JA and Murphy KJ 2013. Proposed procedure for the sampling, preparation and analysis of benthic diatoms from Zambian rivers: a bioassessment and decision support tool applicable to freshwater ecoregions in tropical southern Africa. Africa, Caribbean, Pacific- European Union Project Report.

Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2013. SAFRASS Methodology Manual.

Shrader AM, Bell C, Bertolli L and Ward D 2012. Forest or the trees: at what scale do elephants make foraging decisions? Acta Oecologica 42: 3-10.

Lang P, Taylor J, Bertolli L, 2012. River diatom biodiversity assessments in Zambian rivers: a SAFRASS conservation perspective. European Congress of Conservation Biology, Glasgow.

Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Photographic guide to the Aquatic Macroinvertebrates of Zambia. European Union Project Report.

Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Guide to Common Diatoms. European Union Project Report.

Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Macrophyte Identification Manual.

Conferences and workshops

SAFRASS Diatom Genera Guide Workshop 2013

Programa de Avaliação de Rios no Sul de África (SAFRASS): estabelecimento de uma estrutura de investigação na construção de capacidade para promoção da saúde e biodiversidade dos rios africanos.

Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. *14th Congr. Bras. Limnol., Bonito, Brasil,* Sept. 2013

SAFRASS biomonitoring scheme: general aspects, macrophytes (ZMTR) and benthic macroinvertebrates (ZISS) protocols 2013

SAFRASS Training Introduction May 2012: Helen Dallas

SAFRASS Decision Support Scheme (DSS) to assist the use of river health biomonitoring protocols in Zambia: general aspects, invertebrates (ZISS) and macrophytes (ZMTR) components 2012

SAFRASS Training Macrophytes May 2012 Mike Kennedy 2012

SAFRASS Training Invertebrates May 2012 Steven Lowe

SAFRASS Training Diatoms May 2012 Jonathan Taylor

Shrader AM, Bell C, **Bertolli L** and Ward D 2011. Forest or the trees: at what scale do elephants make foraging decisions? *Ezemvelo KZN Wildlife Contemporary Conservation Symposium*.

SAFRASS Proposed procedure for the sampling, preparation and analysis of benthic diatoms from Zambian rivers: a bioassessment and decision support tool applicable to freshwater ecoregions in tropical southern 2011

SAFRASS Assessment of performance of the SAFRASS pilot river biomonitoring scheme 2011

CURRICULUM VITAE

Name	Stephan Hendrik Jacobs
Profession	Environmentalist
Name of Firm	SiVEST SA (Pty) Ltd
Present Appointment	Environmental Consultant
Years with Firm	5 years
Date of Birth	28 May 1991, Pretoria, South Africa
ID Number	910528 5065 080
Nationality	South African

Education

- Pretoria Boys High, Pretoria, South Africa, Matriculated 2009.

Professional Qualification

- B.Sc. Hons Environmental Management and Analysis, (Post Graduate) University of Pretoria Honours (2014).
- B.Sc. Environmental Sciences (Undergraduate) University Of Pretoria (2012-2013)

Employment Record

Jan 2019 – Current	SiVEST SA (Pty) Ltd - Environmental Consultant
Aug 2018 – Dec 2018	Marang Environmental and Associates (Pty) Ltd – Environmental Consultant
May 2015 – Aug 2018	SiVEST SA (Pty) Ltd – Graduate Environmental Consultant
Nov 2014 – Feb 2015	Sodwana Bay Fishing Charters – Assistant Manager
Oct 2014 – Mar 2015	Ufudu Turtle Tours – Tour Guide

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Excellent	Excellent	Excellent
Afrikaans	Good	Good	Good

Years of Working Experience: 5 Years

Countries of Working Experience

- South Africa

Fields of Specialisation

- Environmental Management

Overview

Stephan originally joined SiVEST in May 2015 and held the position of Graduate Environmental Consultant in the Johannesburg office. After leaving SiVEST in August 2018, and being employed for a brief period at another environmental consulting company, Stephan re-joined SiVEST in January 2019 and currently holds the position of Environmental Consultant in the Gauteng region (Pretoria and Johannesburg).

Stephan has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, in particular renewable energy projects / developments which form part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). As such, Stephan has vast experience with regards to the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs). Additionally, Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has considerable experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.

Skills:

- Strong computer skills (Work, excel, PowerPoint etc.);
- Strong Proposal and report writing skills;
- Report compilation skills for Environmental Impact Assessments (EIAs) and Basic Assessments (BAs);
- Report compilation skills for Environmental Management Plans/Programmes (EMPr);
- Compilation and conducting Visual Impact Assessments;
- Assisting in Surface Water / Wetland Delineations and Assessments.

Key experience:

- Environmental Impact Assessment (EIA) of small, medium and large-scale infrastructure projects,
- Basic Assessment (BA), of small, medium and large-scale infrastructure projects,
- Environmental Management Plans (EMPr), of small, medium and large-scale infrastructure projects,
- Undertaking of Public Participation and Stakeholder Engagement Processes
- Proposal and tender compilation,
- Environmental Compliance and Auditing (ECO);
- Various site inspections, and
- Visual Impact Assessments (Field work and report compilation).

Projects Experience (by Sector)

Stephan is responsible for the following activities: report writing, proposal writing, assisting in specialist surface water delineation and functional assessments, assisting in visual impact assessments and environmental compliance and auditing procedures. Current and completed projects / activities, along with a description of the role played in each project / activity, are outlined in detail below:

ENVIRONMENTAL CONTROL OFFICER (ECO) MONITORING / AUDITING PROJECTS: -

- Environmental Control Officer (ECO) for the Polokwane Integrated Rapid Public Transport System (IRPTS), Limpopo Province.

- Environmental Control Officer (ECO) for Phase 1 and Phase 2 of the Newmarket Retail Development, Gauteng Province.

- Environmental Control Officer (ECO) for the proposed NuPay Office Block development at the Newmarket Retail Development, Gauteng Province.

- Environmental Control Officer (ECO) for the proposed Construction of the Decathlon Building at the Newmarket Retail Development, Gauteng Province.

- Environmental Control Officer (ECO) for the External Road Upgrades at the Newmarket Retail Development, Gauteng Province.

- Environmental Control Officer (ECO) for the Netcare Alberton Hospital Development as part of the Greater Newmarket Development, Gauteng Province.

BASIC ASSESSMENTS (BAS) FOR INFRASTRUCTURE PROJECTS:

- Basic Assessment (BA) for the construction of a Non-Motorised Transport (NMT) Training and Recreational Park adjacent to the Peter Mokaba Stadium in Polokwane, Limpopo Province.
- Basic Assessment (BA) for the Proposed Expansion of the Tissue Manufacturing Capacity at the Twinsaver Kliprivier Operations Base, Gauteng Province.
- Basic Assessment (BA) for the Proposed Construction of a New SPAR Distribution Centre on Erf 1092 at Redhouse in Port Elizabeth, Eastern Cape Province.

BASIC ASSESSMENTS (BAs) FOR RENEWABLE ENERGY PROJECTS:

- Basic Assessment (BA) for the Proposed Construction of the Graskoppies Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Construction of the Hartebeest Leegte Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Construction of the Ithemba Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Construction of the !Xha Boom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Development of the Tooverberg Wind Energy Facility (WEF) near Touws River, Western Cape Province.
- Basic Assessment (BA) for the Proposed Development of the Tooverberg On-site Eskom Substation and 132kV Power Line for the proposed Tooverberg Wind Energy Facility (WEF) near Touws River, Western Cape Province.

ENVIRONMENTAL IMPACT ASSESSMENTS (EIAs) FOR RENEWABLE ENERGY PROJECTS: -

- Environmental Impact Assessment (EIA) for the Proposed Construction of the Graskoppies Wind Farm near Loeriefontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Hartebeest Leegte Wind Farm near Loeriefontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Ithemba Wind Farm near Loeriefontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the !Xha Boom Wind Farm near Loeriefontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the 325MW Rondekop Wind Energy Facility between Matjiesfontein and Sutherland, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Mooi Plaats Solar Photovoltaic (PV) Energy Facility near Noupoort, Northern Cape Province.

- Environmental Impact Assessment (EIA) for the Proposed Construction of the Wonderheuvel Solar Photovoltaic (PV) Energy Facility near Noupoort, Northern Cape Province.

- Environmental Impact Assessment (EIA) for the Proposed Construction of the Paarde Valley Solar Photovoltaic (PV) Energy Facility near Middelburg, Eastern Cape Province.

PART 2 ENVIRONMENTAL AUTHORISATION (EA) AMENDMENT PROCESSES FOR RENEWABLE ENERGY PROJECTS:

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Development of the Aletta 140MW Wind Energy Facility (WEF) and Associated Infrastructure near Copperton, Northern Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Development of the 140 MW Beaufort West Wind Farm in the Prince Albert Local Municipality, Western Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Development of the 140MW Trakas West Wind Farm in the Prince Albert Local Municipality, Western Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the Dwarsrug Wind Farm near Loeriesfontein, Northern Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Graskoppies Wind Farm near Loeriefontein, Northern Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Hartebeest Leegte Wind Farm near Loeriefontein, Northern Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Ithemba Wind Farm near Loeriefontein, Northern Cape Province.

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW !Xha Boom Wind Farm near Loeriefontein, Northern Cape Province.

VISUAL IMPACT ASSESSMENTS (VIAs) FOR INFRASTRUCTURE PROJECTS

- Visual Impact Assessment for the Nsoko Msele Integrated Sugar Project, Swaziland.

- Visual Impact Assessment for the Proposed Tinley Manor South Banks Beach Enhancement Solution, KwaZulu-Natal Province.

- Visual Impact Assessment for the Proposed Tinley Manor South Banks Beach Enhancement Solution, KwaZulu-Natal Province.

- Visual Impact Assessment for the proposed Mlonzi Hotel and Golf Estate Development, Near Lusikisiki, Eastern Cape Province

- Visual Impact Assessment for the Proposed Assagay Valley Development, KwaZulu-Natal Province.

- Visual Impact Assessment for the Proposed Kassier Road North Development, KwaZulu-Natal Province.

VISUAL IMPACT ASSESSMENTS (VIAs) FOR RENEWABLE ENERGY PROJECTS: -

- Visual Impact Assessment for the Helena Solar PV Plant, Northern Cape Province.
- Visual Impact Assessments for the proposed construction of the Sendawo Solar 1, Sendawo Solar 2 and Sendawo Solar 3 Photovoltaic (PV) Energy Facilities near Vryburg, North West Province.
- Visual Impact Assessments for the proposed construction of the Sendawo Substation and Associated 400kV Power Line near Vryburg, North West Province.
- Visual Impact Assessments for the proposed construction of the Tlisitseng Solar 1 and Tlisitseng Solar 2 Photovoltaic (PV) Energy Facilities near Lichtenburg, North West Province.
- Visual Impact Assessment for the proposed construction of the Tlisitseng 1 132kV Substation and associated 132kV Power Line near Lichtenburg, North West Province.
- Visual Impact Assessment for the proposed construction of the Tlisitseng 2 132kV Substation and associated 132kV Power Line near Lichtenburg, North West Province.
- Visual Impact Assessment for the proposed construction of the 3000MW PhilCo Green Energy Wind Farm and Associated Infrastructure near Richmond, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Aletta 140MW Wind Energy Facility neat Copperton, Northern Cape Province.
-
- Visual Impact Assessment for the proposed construction of the Aletta 132kV Substation and associated 132kV Power Line near Copperton, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Eureka 140MW Wind Energy Facility and associated Infrastructure near Copperton, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Eureka 400kV Substation and 400kV Power Line neat Copperton, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province.
- Basic Visual Impact Assessment for the Proposed Construction of the Graskoppies Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province.
- Basic Visual Impact Assessment for the Proposed Construction of the Hartebeest Leegte Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Ithemba Wind Farm near Loeriesfontein, Northern Cape Province.
- Basic Visual Impact Assessment for the Proposed Construction of the Ithemba Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the !Xha Boom Wind Farm near Loeriesfontein, Northern Cape Province.

- Basic Visual Impact Assessment for the Proposed Construction of the !Xha Boom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.

- Visual Impact Assessment for the Proposed Construction of the 315MW Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province.

- Visual Impact Assessment for the Proposed Construction of the 390MW Sankraal Wind Energy Facility near Noupoort, Northern Cape Province.

- Visual Impact Assessment for the proposed development of the Phase 1 Kuruman Wind Energy Facility, Kuruman, Northern Cape Province.

- Visual Impact Assessment for the proposed development of the Phase 2 Kuruman Wind Energy Facility, Kuruman, Northern Cape Province.

- Basic Visual Impact Assessment for the proposed development of Supporting Electrical Infrastructure to the Phase 1 and Phase 2 Kuruman Wind Energy Facilities, Kuruman, Northern Cape Province.

- Visual Impact Assessment for the proposed development of the 325MW Kudusberg Wind Energy Facility (WEF) located between Matjiesfontein and Sutherland in the Northern and Western Cape Provinces.

- Basic Visual Impact Assessment for the proposed construction of up to a 132kV Power Line and Associated Infrastructure for the Rooipunt Solar Thermal Power Plant near Upington, Northern Cape Province.

- Basic Visual Impact Assessment for the proposed construction of up to a 132kV Power Line and Associated Infrastructure for the proposed Kalkaar Solar Thermal Power Plant near Kimberly, Free State and Northern Cape Provinces.

ENVIRONMENTAL SCREENING / ENVIRONMENTAL REVIEW / ENVIRONMENTAL DUE DILIGENCE PROJECTS

- Environmental Review of the Xakwa Coal Operations, adjacent to the proposed Eastside Junction Development.

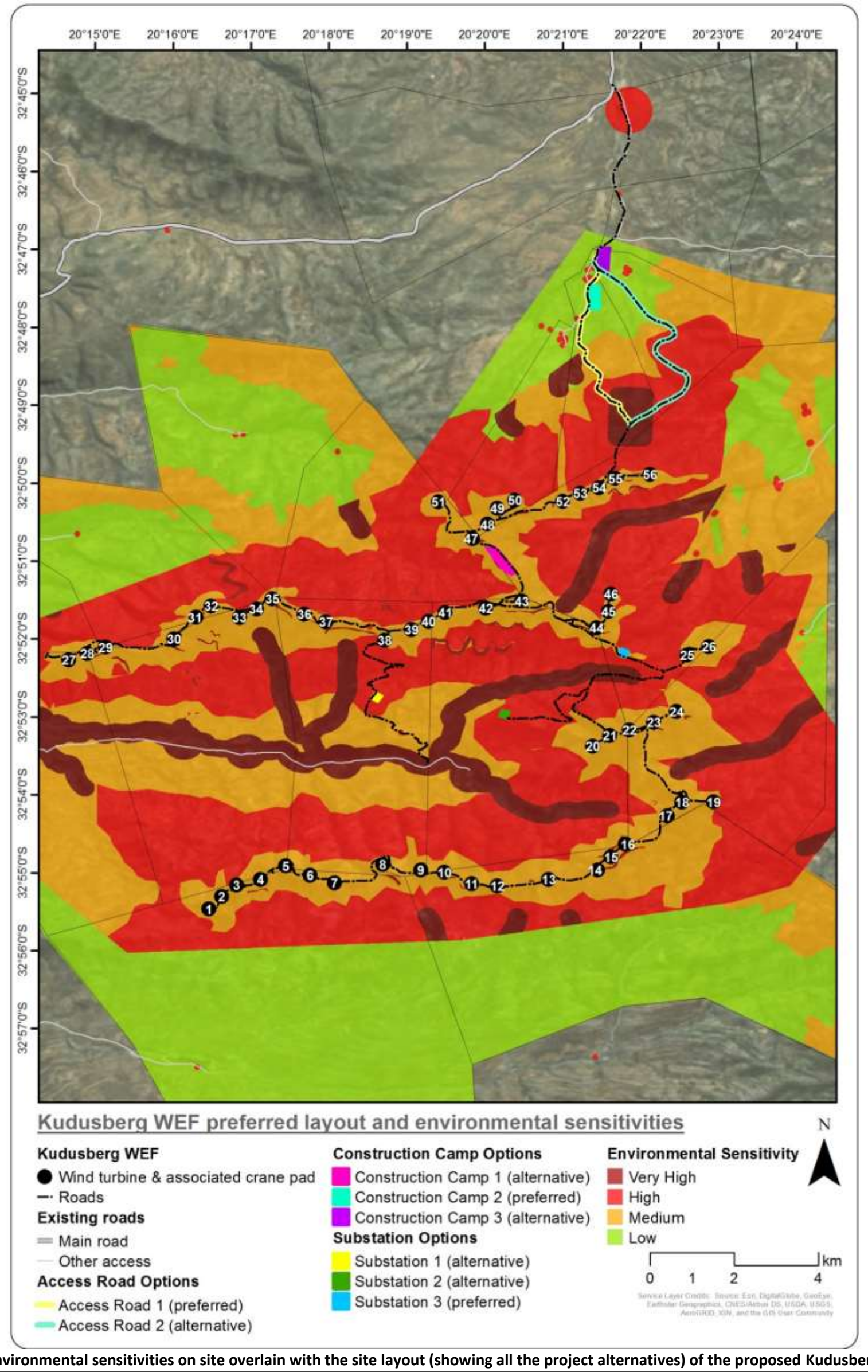
- Environmental Due Diligence for the Woodlands and Harrowdene Office Parks in Woodmead, Gauteng Province.

SURFACE WATER ASSESSMENTS FOR INFRASTRUCTURE PROJECTS

- Surface Water Assessment for the Steve Thswete Local Municipality, Mpumalanga Province.

- Surface Water Delineation and Assessment for the proposed coal Railway Siding at the Welgedacht Marshalling Yard and associated Milner Road Upgrade near Springs, Ekurhuleni Metropolitan Municipality.

APPENDIX B – Layout Map Authorised under BA:

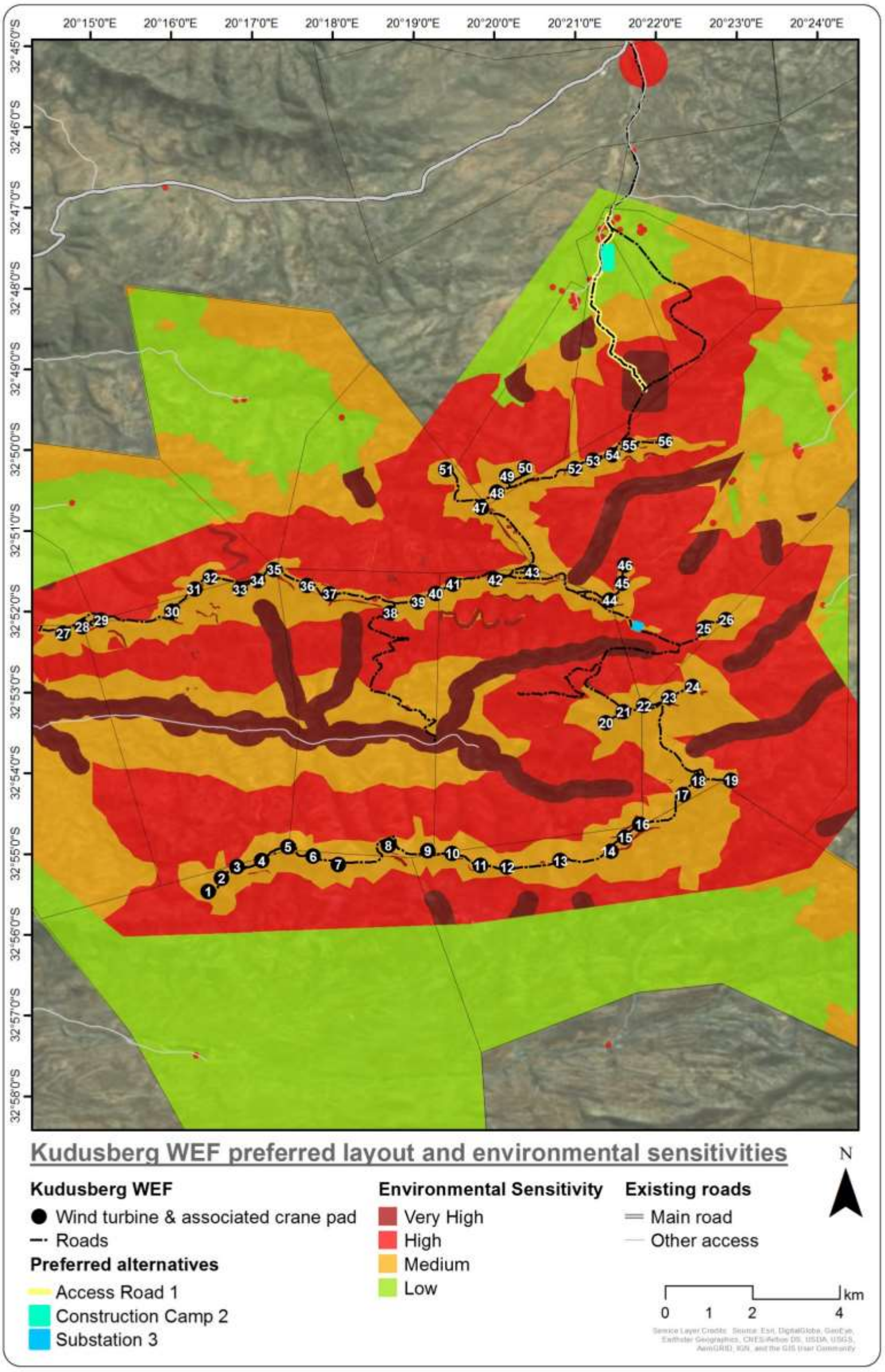


The environmental sensitivities on site overlain with the site layout (showing all the project alternatives) of the proposed Kudusberg WEF.

***Note*:** *At the scale of this map some of the turbine locations may appear to be in high sensitivity areas. However, all turbines avoid high sensitivities.*

Note: Please note that the very-high sensitive areas are not necessarily 'no-go' areas for all infrastructure and therefore all specialist assessments in Appendix D must be consulted.

Note: Please note that this map is for the original 56 turbine positions. The 36 turbine positions proposed after the split are located outside of high sensitive areas and a full updated sensitivity map can be seen in Appendix B below.

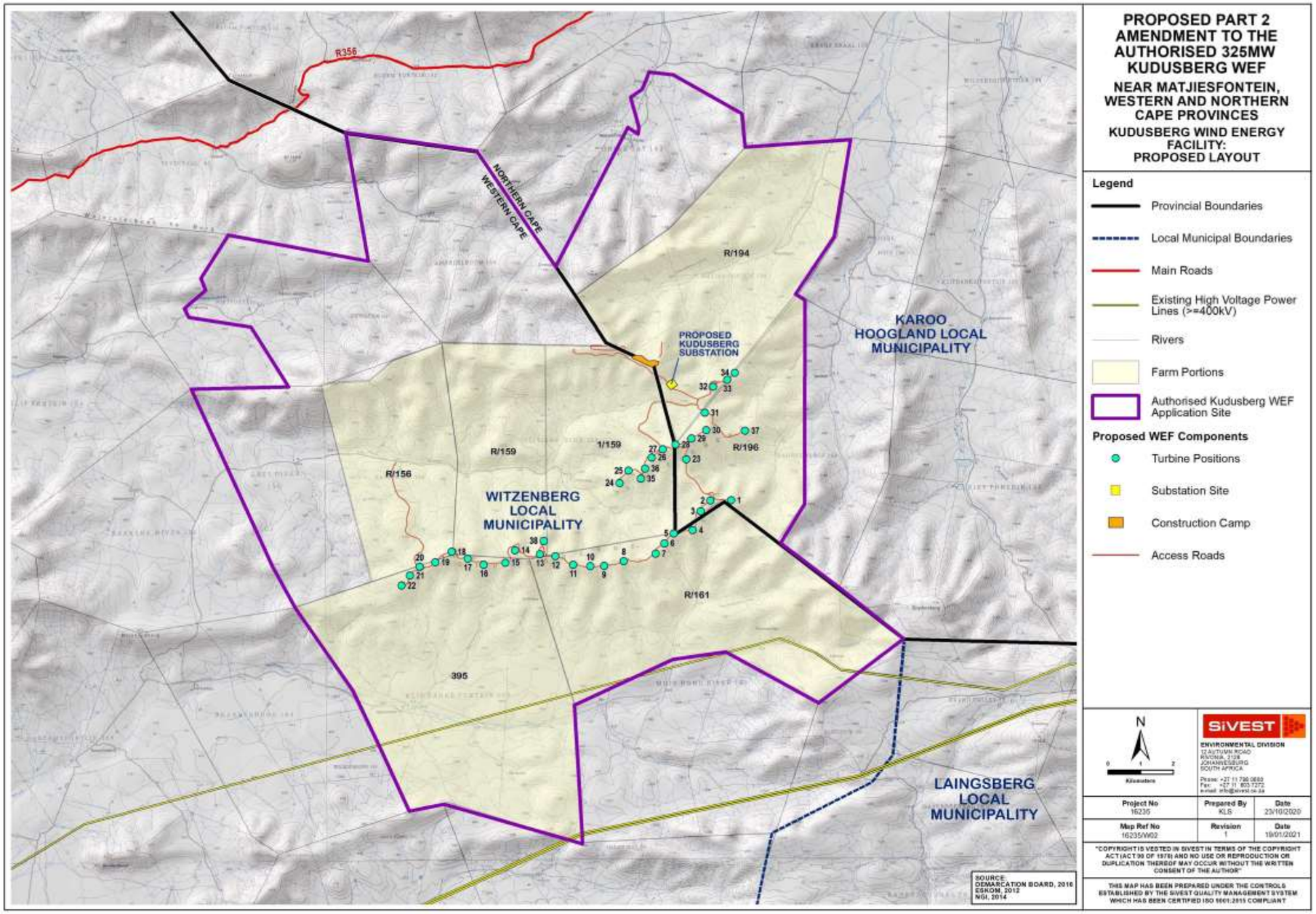


Preferred layout map (showing only the preferred project alternatives) with the environmental sensitivities overlain on site for the proposed Kudusberg WEF.

***Note*: Please note that the very-high sensitive areas are not necessarily 'no-go' areas for all infrastructure and therefore all specialist assessments in Appendix D must be consulted.**

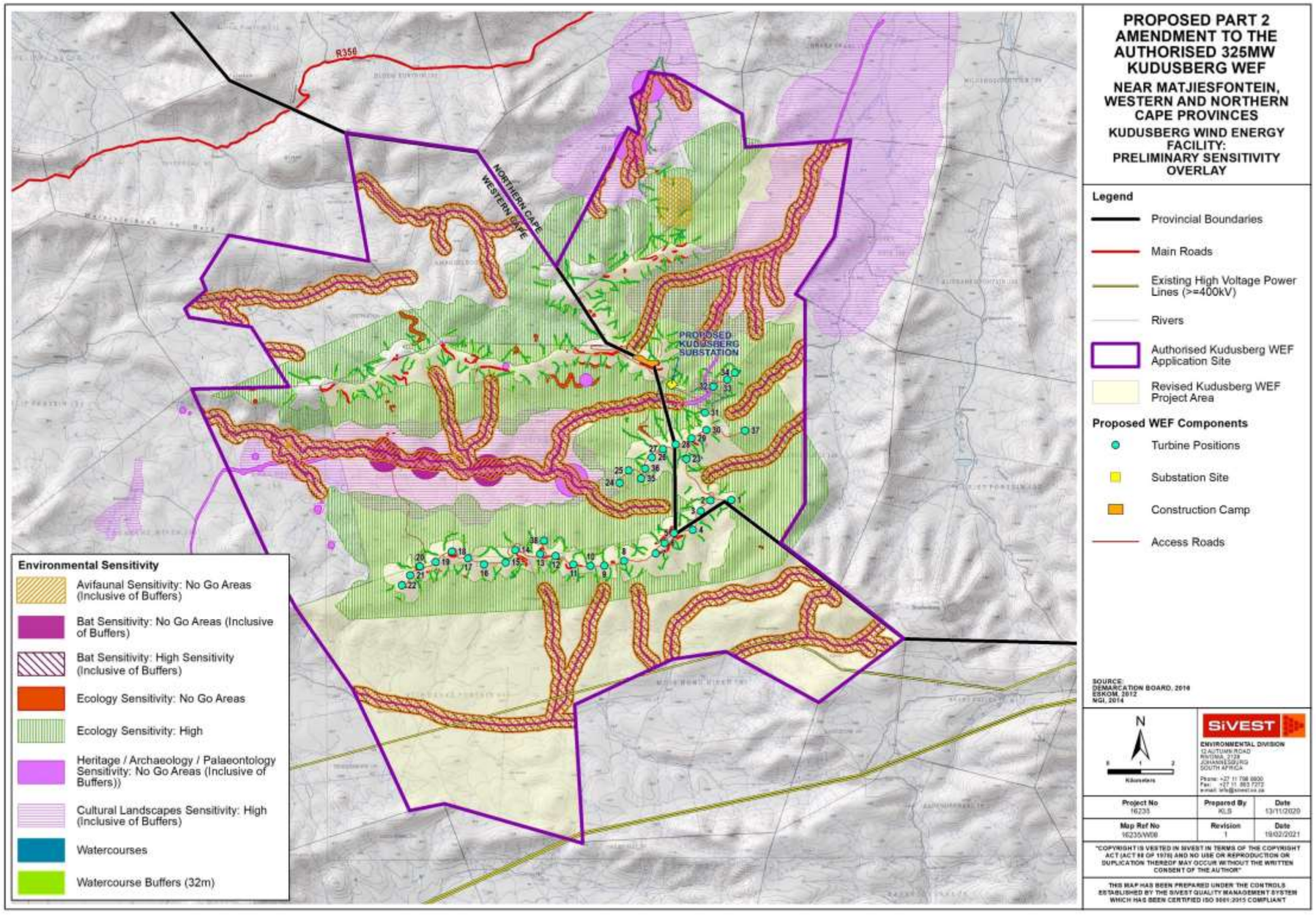
Note: Please note that this map is for the original 56 turbine positions. The 36 turbine positions proposed after the split are located outside of high sensitive areas and a full updated sensitivity map can be seen in Appendix B below.

APPENDIX B – Layout Map of Proposed Amendment:



Layout map for proposed Kudusberg WEF (southern section of the authorised WEF)

The current proposed layout comprising 36 turbines, is the preferred layout that was assessed by all the specialists on the project team (Figure above). This map shows the sensitivities on site (terrestrial and freshwater ecology, as well as sensitive heritage features) within the Kudusberg WEF site that were assessed.



Layout map for proposed Kudusberg WEF (southern section of the authorised WEF) with site sensitivities overlain