VOLUME I

BASIC ASSESSMENT REPORT FOR THE PROPOSED MULILO TOTAL HYDRA STORAGE PROJECT: GRID INTERCONNECTION AND ASSOCIATED INFRASTRUCTURE, NEAR DE AAR IN THE NORTHERN CAPE PROVINCE

On behalf of

MULILO TOTAL HYDRA STORAGE (PTY) LTD

March 2021

FOR PUBLIC COMMENT

Prepared By:

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PROJECT DETAILS

DEFF Reference Number:	To be allocated upon submission	
Arcus Reference No:	4194 Mulilo Total Hydra Storage Project- Grid Interconnection	
Title:	Basic Assessment Report for the Proposed Mulilo Total Hydra Storage Project- Grid Interconnection and associated infrastructure near De Aar in the Northern Cape Province	
EAP:	Ashleigh von der Heyden	Arcus Consultancy Services South Africa (Pty) Ltd
Report Authorisation:	Ashlin Bodasing	Arcus Consultancy Services South Africa (Pty) Ltd
Project Team:	Dr Owen Davies	Arcus Consultancy Services South Africa (Pty) Ltd
	Jamie Pote	Independent
	Jon Smallie	WildSkies (Pty) Ltd
	Dr Brian Colloty	Enviro Sci. (Pty) Ltd
	John Gribble	ACO Associates (Pty) Ltd
	Johann Lanz	Independent Consultant
Project Applicant:	Mulilo Total Hydra Storage (Pty) Ltd	
Report Status:	Basic Assessment Report – Draft for Public Comment	

PUBLIC PARTICIPATION LOCATION DETAILS

This report is available for public review and comment for a period of more than 30 days from 31 March 2021 to 03 May 2021, taking into consideration Chapter 2 Regulation 3 (1); (2) and (3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), at the following locations:

- www.arcusconsulting.co.za; and
- By appointment only and during business hours 09h00 – 16h00):

Address: 19 Van der Merwe Street, DE AAR, 7000
Contact Person: Beverley Horak
Contact Number: 083 793 9254

All comments to the submitted to the EAP no later than 03 May 2021.

ABBREVIATIONS, ACRONYMS AND UNITS

BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CA	Competent Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DEFF	Department of Environment, Forestry and Fisheries (National)
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DHSWS	Department of Human Settlement, Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EGI	Electricity Grid Infrastructure
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
ESKOM	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
LSA	Late Stone Age
MSA	Middle Stone Age
MW	Megawatt
NCR	Noise Control Regulations
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OHPL	Overhead Powerline
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PPA	Power Purchase Agreement
PPP	Public Participation Process
PV	Solar photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMPPP	Risk Mitigation Power Procurement Programme
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SAWS	South African Weather Service
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SPV	Special Purpose Vehicle
WEF	Wind Energy Facility
WULA	Water Use License Application

EXECUTIVE SUMMARY

Introduction

Mulilo Total Hydra Storage (Pty) Ltd ('MTHS') is applying for environmental authorisation for a self-build grid interconnection project which will consist of a short overhead powerline, switching station and access road ('proposed development') as part of the Mulilo Total Hydra Storage Project.

The Mulilo Total Hydra Storage Project is a hybrid electricity generation plant comprising of solar photovoltaic (PV) technology, a battery energy storage system (BESS) and emergency backup Diesel / Gas generator installations (Gensets). The Mulilo Total Hydra Storage Project was bid in the Risk Mitigation Independent Power Producers Procurement Program (RMI4P), and if selected as a preferred bidder, the project would obtain SIP[1] status. The Mulilo Total Hydra Storage Project is located 5km South East of De Aar in the Northern Cape and roughly 8km north of the Eskom Main Transmission Substation (MTS), Hydra.

Project Details:

In terms of the Self-Build agreement for the proposed development, Eskom has provided an indicative Cost Estimate Letter to connect MTHS to the national electricity network (Grid). All environmental approvals for MTHS are in place however the Grid connection works had to be adjusted and a separate Environmental Authorisation is required to be issued for all the infrastructure which is handed over to Eskom on completion.

The following Self-Build works are proposed as part of this Environmental Application.

- A 132kV, 6 x bay switching station is required adjacent to Mulilo Total Hydra Storage Project substation.
- A 6 km long, 12m wide access road is required from the N10 across the De Aar 1/180 farmstead, to the 6 x bay switching station.
- An overhead powerline (OHPL) is needed to evacuate electricity generated from Mulilo Total Hydra Storage Project and is to be approximately 8 km in length, with a capacity of up to 132 kV. The proposed OHPL follows the existing 132 kV Hydra Bushbuck (Solar Capital) OHPL for the most part and will run in a south easterly direction to the Eskom Hydra Main Transmission Substation (MTS).
- A single track service road will be required for the construction and maintenance of the OHPL and would run directly below the OPHL.
- A 132kV Feeder Bay and Busbar extension is required at Hydra Substation.

Department of Environment, Forestry and Fisheries: Information Requirements for Grid Interconnection and Associated Infrastructure Applications

The Department of Environment, Forestry and Fisheries (DEFF) information requirements for the application of the grid interconnection and associated infrastructure is included in this section of the report. Where this information is not provided in the tables below, the location of where it can be found in the report is indicated.

Table A: Details of the Affected Farm Properties

Farm Name	Portion Number	Farm Number	SG 21 Code
Wag 'n Bietje	3	5	C03000000000000500003
Hydra	RE	144	C03000000000014400000

Wag 'n Bietjie Annex C	1	137	C03000000000013700001
Vetlaagte	RE	4	C03000000000000400000
De Aar	1	180	C05700000000018000001
De Aar	55	180	C05700000000018000055
De Aar	56	180	C05700000000018000056

Table B: Preferred OHPL Technical Details

Component	Description / Dimensions
Height of pylons	Maximum of 25 m high
Length of OHPL	Preferred route: Approximately 8 km
Type of poles used	Steel monopole
Corridor within which to construct the OHPL	200 m corridor (i.e., 100 m on either side of the proposed OHPL)
Area occupied by pylon servitude	The pylon servitude width will be approximately 31 m (132 kV) wide
Transmission capacity	Up to 132 kV
Area occupied by both permanent and construction laydown areas	Approximately 2 Hectare (ha)
Area occupied by buildings	Approximately 2 Hectare (ha)
Length of service road	Approximately 8 km
Width of service road	Approximately 6 m
Height of fencing	No fencing for OHPL
Type of fencing	No fencing for OHPL

Table C: Preferred Alternative Proposed OHPL Route Coordinates - Start, Middle and End

Geographical Co-ordinates		Preferred OHPL Route
Start	**Latitude**	30°40'41.20"S
	Longitude	24° 4'2.82"E
Middle	**Latitude**	30°41'53.20"S
	Longitude	24° 5'9.58"E
End	**Latitude**	30°42'55.80"S
	Longitude	24° 5'36.57"E

Table D: Switching Station Technical Details

Component	Description / Dimensions
Area occupied by switching station	Maximum 200 m x 100 m footprint
Capacity of switching station	Up to 132 kV
Area occupied by both permanent and construction laydown areas	Approximately 2 ha (i.e. ~200 m x 100 m)
Area occupied by buildings	Approximately 2 ha (i.e. ~200 m x 100 m)

Length of access road to switching station	Approximately 6 km
Width of access road	Approximately 12m
Access point	Off N10 at 30°41'34.48"S and 24° 2'10.66"E

Table E: Switching Station Corner Co-Ordinates

Geographical Co-ordinates		Switching Station
North	**Latitude**	30°40'39.21"S
	Longitude	24° 3'59.48"E
East	**Latitude**	30°40'39.23"S
	Longitude	24° 4'3.34"E
South	**Latitude**	30°40'44.17"S
	Longitude	24° 4'3.36"E
West	**Latitude**	30°40'44.18"S
	Longitude	24° 3'59.47"E

See Figure i for the proposed geographical co-ordinates of the proposed development.

Table F: Details of the Applicant

Name of the Applicant:	Mulilo Total Hydra Storage (Pty) Ltd		
Name of contact person for applicant (if other):	Warren Morse		
Company/ Trading name (if any):	Mulilo Total Hydra Storage (Pty) Ltd		
Company Registration Number:	2015/070431/07		
BBBEE status:	Level 4		
Physical address:	Top Floor Golf Park 4, Raapenberg Rd, Mowbray		
Postal address:	PO Box 548 Howard Place		
Postal code:	7450	Cell:	-
Telephone:	0216853240	Fax:	-
E-mail:	warrem@mulilo.com		

Table G: Details of the Environmental Assessment Practitioner

Name of the EAP organisation:	Arcus Consultancy Services South Africa (Pty) Ltd		
Person who compiled this Report:	Ashleigh von der Heyden		
Contact Person (if not author):	Ashleigh von der Heyden		
Postal address:	Office 607, Cube Work Space, 24 Hans Strijdom Avenue, Cape Town		
Telephone:	(021) 412 1529	Postal Code:	8001
Cellular:	0798951456	Fax:	(-) -
E-mail:	ashleighvdh@arcusconsulting.co.za / deaar@arcusconsulting.co.za		
EAP Qualifications:	Bachelor of Science (Hons): Conservation Ecology SACNASP: 117167		

Details of Lead EAP Expertise	Ashleigh is a Senior Environmental Consultant at Arcus. She is a registered SACNASP Environmental Consultant with 5 years working experience in the environmental sector, namely the Mining and Renewable Energy sectors. In addition, she has international reporting experience for the International Finance Corporation (IFC) and Equator Principles (EP) Performance Standards and the World Bank Environmental Guidelines. Ashleigh has a proven track record in managing environmental projects to the required quality standards, timeframes and budgets. Her core responsibilities include client management and project implementation, reporting and execution. Her day-to-day responsibilities include report review, stakeholder engagement and business development. Ashleigh completed her BSc (Hons) in Conservation Ecology at the University of Stellenbosch and is currently completing her MSc at the University of Witwatersrand. She is a member of the Soil Science Society of South Africa (SSSSA) and is completing her Project Management Professional (PMP) Certification through the Project Management Institute (PMI). Ashleigh has attended certified workshops and training courses in Environmental Law, Environmental Waste Act Enforcement, Soil Surveyance and Soil Classification and Section 21 Water use Licencing. Lastly, Ashleigh has worked in both South Africa and Zimbabwe

Please See Appendix A for EAP Declaration of Independence and Curriculum Vitae (CV).

Table H: BA Project Team

Name	Organisation	Role
Dr Owen Davies	Arcus	Bird Impact Assessment
Jon Smallie	Independent	External Review of Bird Impact Assessment
Dr Owen Davies	Arcus	Terrestrial Ecological Impact Assessment (Flora and Fauna)
Jamie Pote	Independent	External Review of Ecology Impact Assessment
Dr Brian Colloty	Enviro Sci (Pty) Ltd	Freshwater and Wetlands Impact Assessment
Johann Lanz	Independent	Geology, Soils and Agriculture Impact Assessment
John Gribble	ACO Associates	Heritage and Archaeological Impact Assessment

Please see Volume II of this Basic Assessment Report (BAR) for the specialist impact assessment reports produced for this development.

Table I: DEFF Applicable Listed Activities

LISTING NOTICE	ACTIVITIES
LN 1 GN R327[2]	11; 12; 14; 19; 24(ii); 27(i); 28(ii); 48 and 56.
LN 3 GN R324[3]	4(g)(ii); 10 (g)(ii); 12(g)(i); 14(ii)(a)(c)(g)(ii)(bb)(ff); 18 (g)(bb)(ee) and 23(ii)(a)(c)(g)(i).

[2] "Listing Notice 1 of the EIA Regulations, promulgated under Government Notice R983 of 4 December 2014, as amended by Government Notice R327 of 7 April 2017."

[3] "Listing Notice 3 of the EIA Regulations, promulgated0 under Government Notice R985 of 4 December 2014, as amended by Government Notice R324 of 7 April 2017."

Summary of Findings

Soil and Agriculture:

The assessment soil and agricultural assessment found that the aridity of the soil is a limitation to agricultural production. It was concluded that the study area is unsuitable for cultivation, and that agricultural land use is limited to low density grazing. The specialist concluded that the proposed development has negligible impact on agriculture in this environment for two reasons: (1) Overhead powerlines have no agricultural impact because all agricultural activities that are viable in this environment (grazing) can continue completely unhindered underneath transmission lines, and (2) the direct, permanent, and physical footprint of the development that has any potential to interfere with agriculture, is restricted to pylon bases and a small switching station that, in the context of the agricultural environment of low density grazing on farms which are typically thousands of hectares large, is entirely insignificant.

This assessment has found that the proposed development will have no impact on any arable land. Because of the low agricultural potential of the site, the low agricultural impact potential of the kind of development that is proposed, and the consequent **low** agricultural impact, **there are no restrictions relating to agriculture (including soils) which would preclude authorisation of the proposed development**. The proposed development will not have an unacceptable, negative impact on the agricultural production capability of the site. Therefore, from an agricultural impact point of view, the development should be authorised

Aquatic:

In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment, all the watercourses within the site have been assigned a condition score of B (Nel et al. 2011), indicating that they are largely intact and of biological significance. The OHPL traverses two lower lying areas which direct water towards drainage lines through which water is channelled during rainfall events. However, based on the description of the project components when compared to the results of the aquatic baseline assessment[4] and the impacts that were evaluated, the overall risk with mitigation would below be low for the corridor that was assessed, particularly as the proposed route will avoid any significant alluvial and or wetland systems.

The proposed development is unlikely to have any impacts on the aquatic environment as for the most part the final placement of the towers would avoid the delineated wetlands and watercourses.

Thus, based on the findings of the specialist study, significance of the impacts assessed for the aquatic systems after mitigation would be **low**. The specialist has **no objection to the authorisation of any of the proposed activities for the proposed development**.

Biodiversity/Plant Species:

One broad vegetation type occurs in the study area, namely the Northern Upper Karoo (NKu3). The Northern Upper Karoo occurs in the lowland areas where Dwarf karoo shrubs, scattered grasses and occasional large shrubs dominate. The vegetation in the assessment corridor has suffered from overgrazing by varying degrees, however since this vegetation type is fairly widespread throughout the broader region and largely untransformed, the vegetation type is considered to be *Least Threatened* and floral species found on the site are not at significant risk of negative impact from the development.

The proposed development does not impact any Critical Biodiversity Area (CBA) 1 or CBA2 areas but is positioned wholly within an area classified as an Ecological Support Area (ESA). This ESA is largely due to the presence of the Platberg-Karoo Conservancy Important Bird

[4] Colloty, 2020: The De Aar 2 South WEF Aquatic Impact Assessment.

Area (IBA). The position of the proposed development alongside multiple existing power lines converging on the Hydra Main Transmission Substation (MTS) and the relatively small size of the development footprint makes it highly unlikely that the proposed development will have a significant negative impact on the functioning and goals of the ESA or the biodiversity in the area.

Biodiversity/Animal Species:

Bird Species

The OHPL and its associated infrastructure fall within the Platberg-Karoo Conservancy Important Bird Area (IBA).

Power lines in the district have been identified as a high threat to large terrestrial birds such as cranes and bustards, which collide with them, and to raptors, which have been electrocuted while perching on them. Power lines can, however, also be beneficial to large raptors which breed on them in areas where large trees are uncommon.

Some areas around the project site are known to be important breeding and 'lekking' grounds for the Endangered Ludwig's Bustard *(Neotis ludwigii)*. 'Lekking' is a mating system where males congregate in an area to display to females, Ludwig's Bustards exhibit an 'exploded' or 'dispersed' lekking system in which the displaying males are more widely spread over an area than typical of more conventional lekking arenas observed in other species[5]. While the project site is not directly within these areas, the species could potentially be impacted upon while traversing the project site to and from these areas.

Mammal Species

There were 61 mammal species listed in the various databases that could occur in the study area, 12 of which are listed as threatened or near threatened. Based on the habitats present in the grid connection corridor and surrounding areas, it is considered likely that some of these species could potentially occur on site.

Amphibian Species

There are 13 amphibian species that have a geographical distribution that includes the project site. The Giant Bullfrog *(Pyxicephalus adspersus)* is listed by NEMBA as a *Protected Species*. This species was located in the broader area surrounding the project site and could potentially occur in the grid connection corridor near temporarily inundated depressions.

Reptiles Species

There are 23 reptile species recorded in the various databases or observed from in or around the area project site that could occur in the area. The Karoo Padloper *(Chersobius [Homopus] boulengeri*) is listed as Near Threatened in the Regional Red List, however a more recent assessment lists the species as Endangered as most localities where populations previously occurred no longer harbour viable populations and that the species is no longer being found by farmers. The Karoo Padloper is associated with dolerite ridges and rocky-outcrops in dwarf shrubland containing succulent and grassy elements. Such habitat is present on the project site and it could potentially occur in the area, albeit with a low probability.

Invertebrate Species

There are 159 invertebrate species recorded from various databases that could occur on the project site. While this list cannot be considered to be complete, a single species with a distribution range that potentially overlaps the project site is listed by the IUCN as *Vulnerable*, namely the Harlequin Sprite *(Pseudagrion newtoni).* This damselfly is currently known from only a single location in Mpumalanga, the probability for this species to occur on site is low.

[5] Allan DG: Ludwig's Bustard. In Roberts Birds of Southern Africa. 7th edition. Edited by: Hockey PAR, Dean WJR, Ryan PG. Trustees of the John Voelcker Bird Book Fund, Cape Town; 2005:293–294.

The power line and associated infrastructure is unlikely to generate significant impacts on flora and fauna after mitigation. No highly significant negative impacts that cannot be adequately mitigated against were observed, therefore **from a terrestrial flora and fauna perspective there are no reasons to oppose the development**. The development can be supported in terms of its low potential impact to terrestrial ecology.

Lastly, the proposed project is unlikely to generate significant impacts on avifauna after mitigation. No highly significant negative impacts were observed, therefore **from an avifaunal perspective the proposed project can be authorised if all recommendations and mitigation measures are implemented accordingly**

Heritage:

A large number of archaeological occurrences which include Middle and Late Stone Age archaeological material, possible historic period stone structures, Khoikhoi stone kraal complexes, some rock engravings and scattered occurrences of historical period archaeological material were identified on site. The volume of and ubiquitous nature of the Middle Stone Age artefacts scattered across the landscape, and the fact that much of this material was found to be in secondary, or disturbed context, means that the combined overall impact of activities associated with this project on Middle Stone Age material will be relatively low. The context of much of the Late Stone Age artefacts noted, appeared to be better preserved than the Middle Stone Age material, and is thus of greater archaeological significance. More occurrences that could be called “sites” were noted with the Late Stone Age material, and the assessment found that if these sites were to be lost or damaged as a result of the construction phase, the impact would be high, although this could be reduced to low through the application of measures.

Previous research, including fieldwork carried out for previous developments, showed that fossils are rare in the area. There is thus a very small chance of fossils being encountered during the construction of the grid connection and switching station. To mitigate any potential impacts, it is recommended that a Fossil Chance Find Protocol be implemented at the start of construction, and for the life of the construction which would ensure the conservation and reporting of any finds of fossil material.

Archaeological resources are widespread but of generally limited significance in the general area of the proposed project. Although palaeontological material is likely to be present in parts of the project footprint, there is a very small chance of fossils being encountered during the construction activities.

The overall impact of the project on heritage resources is assessed to tolerable and generally of medium significance. Provided that the mitigation measures are implemented, the **overall impact of the proposed development is generally of low heritage significance and the proposed activity is considered acceptable**

Conclusion

The grid interconnection, switching station and access road will have limited impact on the surrounding environment. **Identified impacts can be mitigated to acceptable levels and are generally of low significance**. In addition, the proposed OHPL is within an existing reserve for most part and follows the existing grid connection transmission route of the Eskom Hydra-Bushbuck 132 kV Line.The majority of potential impacts identified to be associated with the construction and operation of the proposed development infrastructure are anticipated to be localised and restricted to the proposed site.

The potentially sensitive areas / environmental features that have been identified include:

- Sensitive vegetation;
- Bird species of conservation concern.

It is the opinion of the EAP that the proposed Mulilo Total Hydra Storage Grid Interconnection project, including switching station and access road can be authorised, subject to the implementation of the required mitigation measures and subject to conditions contained in the Environmental Management Programme.

Summary of Construction, Operation and Decommissioning Phase Impacts

Construction Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
The only possible source of impact is minimal disturbance to the land during construction and decommissioning	L	L	L	Negative	Very Low	H	H
Freshwater & Wetlands							
Loss of riparian system, and disturbance of the alluvial watercourses during construction and decommissioning	M	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Increase in surface run-off during construction, operation and decommissioning	M	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Sedimentation & Erosion construction, operation and decommissioning	M	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Localised surface water quality construction, operation and decommissioning	M	M	M	Negative	M	L	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Terrestrial Ecology							
Loss of fragmentation of indigenous natural vegetation as well as habitat destruction during construction	L	M	L	Negative	L	L	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*

Construction Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Loss of faunal habitat and refugia during construction and decommissioning	L	H	M	Negative	M	M	H
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Direct impact to fauna construction and decommissioning	L	L	M	Negative	L	L	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Displacement or disturbance of fauna during construction, operation and decommissioning	L	L	M	Negative	L	L	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Avifauna							
Collision and Electrocution during operation	M	M	M	Negative	M	M	H
With Mitigation	*M*	*M*	*M*	*Negative*	***L***	*L*	*H*
Heritage, Archaeology & Palaeontology							
On archaeological resources construction, operation and decommissioning	L	H	L	Negative	M	L	H
With Mitigation	*L*	*H*	*L*	*Neutral/* ***Positive***	***M***	*L*	*H*
On paleontological resources construction, operation and decommissioning	L	H	L	Negative	M	L	H
With Mitigation	*L*	*H*	*L*	*Neutral/* ***Positive***	***M***	*L*	*H*

Summary of Cumulative Phase Impacts

Cumulative Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Soil and Agricultural Potential							
Change of Land Use and Capability	L	L	L	Negative	L	L	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*L*
Freshwater & Wetlands							
Hydrological conditions	M	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*L*
Ecology							
Habitat destruction, collisions and electrocution, in the context of existing power lines in the area.	M	M	M	Negative	L	L	M
With Mitigation	M	M	M	Negative	**L**	L	M
Heritage: Archaeology and Palaeontology							
All impacts Archaeology and Palaeontology	M	M	M	Negative	L	L	M
With Mitigation	*M*	*M*	*M*	*Negative*	*L*	*L*	*M*

TABLE OF CONTENTS

TABLE LIST

FIGURE LIST

PLATE LIST

1 INTRODUCTION

Mulilo Total Hydra Storage (Pty) Ltd ('MTHS) appointed Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') to undertake this basic assessment process for environmental authorisation.

1.1 The Mulilo Total Hydra Storage Project

Mulilo Total Hydra Storage Project is a hybrid electricity generation plant comprising of solar photovoltaic (PV) technology, battery energy storage systems (BESS) and emergency backup diesel / gas generator installations (Gensets). The project was bid in the Risk Mitigation Independent Power Producers Procurement Program (RMI4P), and if selected as a preferred bidder, the project would obtain SIP status.

Outlined in Plate 1.1 below are the various projects which make up the Mulilo Total Hydra Storage Project. The three hybrid solar PV projects have been combined to (1) optimise the use of common infrastructure, (2) benefit from shared resources and utilities which ultimately reduce the cost of energy to the consumer and (3) lessen the impacts to the surrounding environment. The Solar PV component of the project will contribute a combined installed capacity of 400 MW and will primarily be utilised to charge the BESS. It is anticipated that any surplus solar PV yield, up to the Maximum Export Capacity (MEC), would be exported to the grid if requested by the grid operator. In addition, the BESS is to have an energy storage capacity of 450 MWh and the two small <10MW Gensets are included in the design to provide backup charging energy for the BESS following rare instances of extended periods of low radiation. The Gensets will remain isolated from the grid and only charge the BESS as a switched alternative supply.

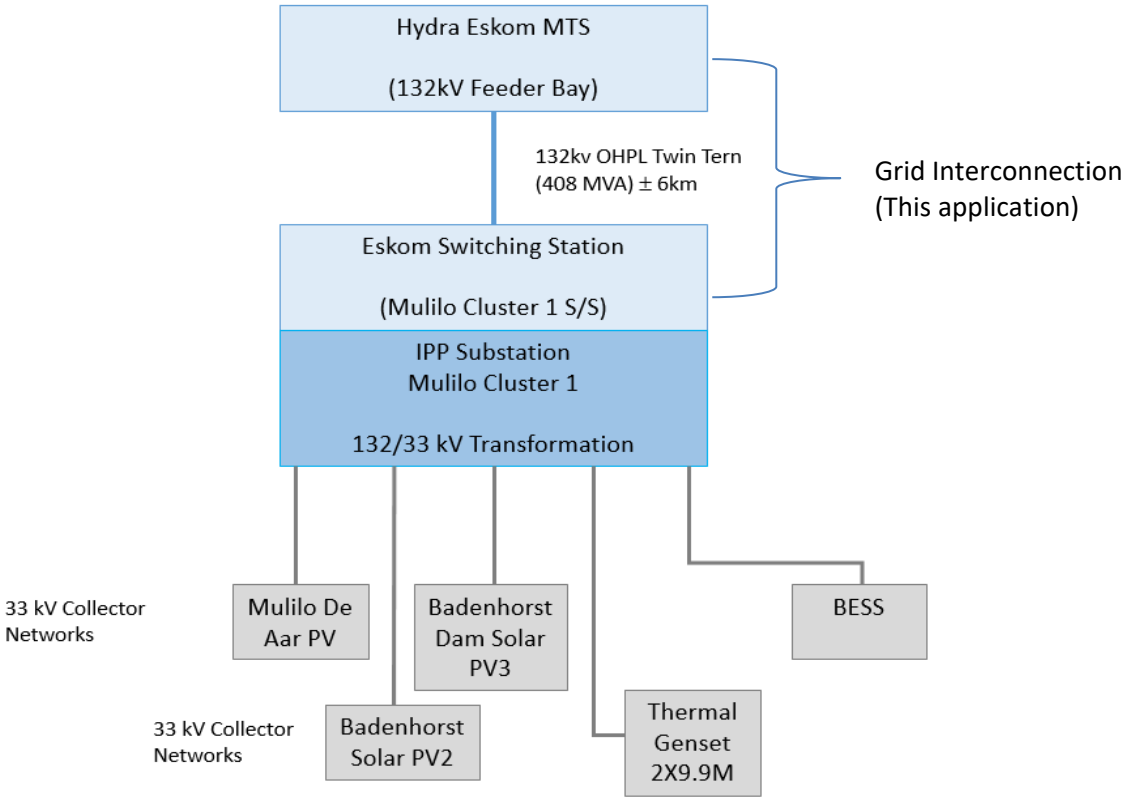

Plate 1-1: Mulilo Total Hydra Storage Project

The above aspects have all been incorporated into three previously authorized hybrid solar PV projects, all located adjacent to one another, and are not part of this Basic Assessment process. Aurecon (Pty) Ltd were appointed as the Environmental Assessment Practitioner to manage and undertake these three impact assessment processes for the hybrid solar projects. The final Environmental Impact Assessment Reports for each facility was submitted on the following dates:

- Mulilo De Aar PV: 20 April 2012 – DEA Reference Number 12/12/20/2499
  - Generator & Line Route: EA Amendment Application: December 2020
- Badenhorst Solar PV2: 9 April 2014 – DEA Reference Number 14/12/16/3/3/2/504
  - BESS: EA Amendment Application: September 2020
- Badenhorst Dam Solar PV3: 23 March 2015 DEA Reference Number 14/12/16/3/3/2/483
  - BESS: EA Amendment Application: September 2020
  - Generator: EA Amendment Application: December 2020

1.2 Proposed Project Details:

1.2.1 MTHS Self Build Grid Interconnection (Overhead power line):

The overhead powerline (OHPL) will evacuate electricity generated from the Mulilo Total Hydra Storage Project and is to be approximately 8 km in length, with a capacity of up to 132 kV. The proposed OHPL follows the existing 132 kV Eskom Hydra-Bushbuck OHPL for the most part, and will run in a south easterly direction to the Eskom Hydra Main Transmission Substation (MTS). A single track service road will be required for the construction and maintenance of the OHPL and would run directly below the OPHL. The intended end-user for this project is Eskom, and responsibility will be handed over to Eskom should favourable environmental authorisation be granted and the project successfully commissioned.

The grid connection route considered in this application was previously assessed as a 200m wide corridor (100m on either side of the line) for the 400 kV grid connection associated with the Mulilo De Aar 2 South Wind Energy Facility ('DA2S WEF') (Arcus, 2021). The specialist assessments conducted for this route have been used to inform the baseline environment and impacts for this proposed development

- Design and construct ±8 km of single circuit 132 kV overhead power line (OHPL), between the Hydra MTS and Mulilo Total Hydra Storage Project;
- The overhead power line is to be strung with twin tern conductor;
- Preferred technology to be that of bird friendly steel monopole structures. These are to be used with a maximum height of 25m.
- Telecommunication via fibre optic is required on the 8km HV Line.

Associated infrastructure will include:

- Foundations and insulators;
- Existing access roads and jeep tracks; and
- Line and servitude clearances to meet the statutory requirements.

1.2.2 MTHS Self-Build Associated Infrastructure:

This associated infrastructure is being mentioned as part of this report as they form part of the Grid Interconnection Project to be handed over to Eskom for commissioning responsibility.

1.2.2.1 Switching Station Access Road:

A 6km long, 12 m wide access road is required for construction and maintenance of the self-build switching station. Access begins off the N10 highway and terminates at the self-build switching station. A <6m service road continues along the proposed OHPL route within the servitude, and as far as possible, this road will be used.

1.2.2.2 Self-Build Switching Station:

A 132 kV, double busbar switching station, is required to be constructed at the Mulilo Total Hydra Storage Project site. The switching station is named the Self Build Switching Station, and will house the required metering and protection equipment inside various substation buildings. In addition, there will be spatial provision to establish at least four additional outgoing feeder bays with access to the property for at least two additional incoming line bays to cater for future expansions. The switching station will eventually contain six bays but would start with the initial two bays as required by the Mulilo Total Hydra Storage project. The land required would be 100 m x 100 m for the 2-bay phase, increasing to 200 m x 100 m for six bays and with a maximum height of 25 m.

1.2.3 Additional Project Considerations:

The following two project considerations have been proposed by MTHS as part of the self-build agreement with Eskom. These will be commissioned in terms of Eskom's Build guidelines and preference.

1.2.3.1 Upgrades at Hydra MTS:

As part of the above-mentioned self-build, MTHS intend on extending the existing 132kV double busbars by one bay and establishing a new 132kV feeder bay at the Eskom Hydra MTS. This upgrade will also include protection and metering components.

1.2.4 Alternatives Considered:

Should an alternative powerline route be required, MTHS have identified a possible solution and have engaged with the Eskom Grid Access Unit to establish its viability.

MTHS are proposing to perform a "loop in loop out" onto one circuit of the existing Eskom Hydra-Bushbuck double circuit 132kV OHPL and to restring the remaining portion of that circuit (if required) between the Project and the Hydra Substation. The purpose of the proposed restring is provide additional electricity evacuation option to Eskom and to the Mulilo Total Hydra Storage Project and to minimise any potential servitude or feeder bay constraints at the Hydra Substation. This proposed commission will not trigger any additional activities other than those being applied for.

1.3 Purpose and Structure of this Report

This BA report aims to provide the following information for the competent authority to make an informed decision on the application:

- Policy and legislative context of the proposed development;
- Methodology used to conduct the assessment and derive an outcome;
- The public participation process;
- The baseline environmental conditions including any specialists' studies conducted;
- The need and desirability;
- The assessment of alternatives; and
- The results of the impact assessment.

The BA Report is set out in two volumes:

Volume I: BA Report; and

Volume II: Specialist Reports.

Table 1.1: Structure of this Report

Section	Title	Containing
1	Introduction	Purpose and Structure of the BA Report, Overview of the BA process, and the Assumptions and Limitations of the study.
2	Environmental Legal Framework	National Environmental Legislation, International Conventions and Treaties, Policies and Guidelines.
3	Methodology	NEMA Requirements, DEFF Screening Tool, Specialists Studies Methodology, Assessment Techniques for the BA
4	Public Participation Process	Initial Notification, BA Phase Public Participation Process, Summary of Issues.
5	Description of the Baseline Environment	A description of the Affected Environment.
6	Need and Desirability	Description of the Need and Desirability of the Proposed Development.
7	Assessment of Alternatives	Route, Location and Layout, Grid Interconnection, and No-Go Alternatives.
8	The Preferred Alternative	Description of the preferred alternative assessed for the proposed development
9	Assessment of Potential Impacts	A Detailed Assessment of the Potential Impacts During the Construction, Operational and Decommissioning Phases.
10	Assessment of Cumulative Impacts	A Detailed Assessment of the Potential Cumulative Impacts.
11	Summary of Findings and Recommendations	A summary of the Findings and Recommendations of the Impact Assessment.
12	Conditions to be included in the EA	Conditions to be included in the EA.
13	Impact Statement and Conclusion	Conclusion of the assessment.
Appendix A	EAP Declaration of Independence and CV	Commissioner of Oaths EAP Declaration of Independence and CV of the EAP.
Appendix B	Environmental Management Programme	Generic EMPr for grid OHPL and Generic EMPr for switching station and associated infrastructure.
Appendix C	Public Participation Report	Public Participation Processes to date.

1.4 Overview of the BA Process

The application for environmental authorisation and assessment of impacts is ultimately a decision-making process with the specific aim of selecting an option that is technically feasible, practical, and will cause the least impact to the environment. The BA process identifies activities which may have a detrimental effect on the environment, and which would therefore require Environmental Authorisation prior to commencement.

The independent environmental assessment practitioner (EAP) and various specialists identified potential negative and positive impacts that could arise as a result of the proposed development. Mitigation measures were also recommended which would allow for the avoidance or reduction of negative impacts or which may enhance positive impacts. The appointment of specialists was made based on the list of specialists whom undertook the original assessments for the up to 400kV De Aar 2 South Grid Connection (Arcus, 2021). The same specialists were commissioned to provide an opinion in the status quo of their original assessment in relation to the proposed development, and whether or not the proposed development will change the significance of impacts assessed in the original reports. The original specialist assessments have been appended to the specialist statements and site verification reports for this environmental authorisation and basic assessment report.

The key phases of this BA process are described below:

- **Pre-Application Process**: The DEFF is consulted during a pre-application meeting to confirm the process which will be followed, including discussions based on the results of the Screening Tool, appointment of specialists, and the Public Participation Process which will be followed.

- **Initial Notification and Call to Register as I&APs through the following:** Advertisements, site notices, posters and notification e-mails. The aim of this step is to inform people of the proposed activity and to encourage initial comment and feedback.

- **Basic Assessment Process: Collation of initial comments and specialist investigations into a concise report (this document) which provides feedback on the following:**
  - Nature of the activity;
  - Methodology used to conduct the assessment and derive an outcome;
  - The public participation process;
  - The baseline environmental conditions including any specialists' studies conducted;
  - The need and desirability;
  - Identification of potential feasible alternatives;
  - Identification of potential positive and negative impacts; and
  - Identification of knowledge gaps.

The identified impacts have been assessed and any specific management and mitigation measures have been included in the Generic Environmental Management Programmes (EMPr) (Appendix B). The findings are included in this Report.

- **Ongoing Public Consultation:** Interested and Affected Parties (I&APs) are consulted on an on-going basis throughout the BA Process. This involvement was initiated through the dissemination of information by means of advertisements, notification letters, posters and site notices. Opportunities are provided for I&APs to review the Draft Basic Assessment Report.

Following the completion of the relevant processes described above and the submission of documentation to the competent authority (DEFF), the DEFF will review the application and issue a decision on whether to grant the applicant Environmental Authorisation. I&APs will be informed of the decision and their rights to appeal.

1.5 Assumptions and Limitations

The following assumptions and limitations are applicable:

- The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- It is assumed that the information contained in the Screening Report generated is accurate and correct and valid at the time of preparing this report.
- It should be emphasised that information, as presented in this report, only has reference to the study area as indicated on the accompanying figures. Therefore, this information cannot be applied to any other area without detailed investigation.
- The assumptions and limitations, presented in each specialist statement, Volume II of this report, are noted for the BA Report.
- It is assumed that the 200 m corridor investigated and assessed for the proposed OHPL route is technically suitable for such development.
- It is assumed that final micrositing will take place should authorisation be received.
- It is assumed that the connection to the national grid via the existing Eskom Hydra Substation is technically adequate, feasible and viable.
- It is assumed that the recommendations derived from this study would be included in all tender documentation and the EMPr for implementation.

2 ENVIRONMENTAL LEGAL FRAMEWORK

The legislation that is relevant to this BAR is briefly outlined below in Section 2.1, Section 2.2 and Section 2.3. These legislative requirements, guidelines, policies or frameworks are not intended to be definitive or exhaustive but serve to highlight key legislative responsibilities that this report considers or intends to apply.

The Listed Activities applicable to this proposed project are presented in Table 2.1 below. All potential impacts associated with these Listed Activities has been considered and adequately assessed in this BA Report.

Table 2.1: NEMA Listed Activities in Relation to the Proposed Development

Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
Listing Notice 1 GN R 327 Activity 11	The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts	Authorisation is required for a transmission line with up to 132 kV capacity
Listing Notice 1 GN R 327 Activity 12	The development of- (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) within a watercourse; (c) if no development setback exists within 32 m of a watercourse, measured from the edge of a watercourse.	Infrastructure such as the access road and OHPL may be situated within 32 m of a watercourse, measured from the edge of a watercourse.
Listing Notice 1 GN R 327 Activity 14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres	The proposed switching station is likely to require the use of diesel/gas/transformer oils/other hazardous substances during the construction and operational phase.

	or more but not exceeding 500 cubic metres.	
Listing Notice 1 GN R 327 Activity 19	The infilling or depositing of any material of more than 10 cubic metres into or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.	It may be the instance where the project will require dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse
Listing Notice 1 GN R 327 Activity 24	The development of a road (ii) with a reserve wider than 13,5 meters or where no reserve exists where the road is wider than 8 meters	The construction of the access road to the switching station is proposed to be 12 m wide. The OHPL service roads will be 6m wide.
Listing Notice 1 GN R 327 Activity 27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of vegetation is required for (i) the undertaking of a linear activity	The development of the switching station and the infrastructure associated with the OHPL that is non-liner could require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 1 GN R 327 Activity 28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	Construction of the switching station and access road will change the land use from agriculture to mixed - agriculture and electricity transmission. The proposed development is outside an urban area and has a footprint that will exceed 1 ha.
Listing Notice 1 GN R 327 Activity 48	The expansion of- Infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	It may be the case where infrastructure or structures are expanded within 32m of a watercourse. The culmination of these expansions may exceed 100m square meters.
Listing Notice 1 GN R 327 Activity 56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13.5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	Existing farm access roads may need to be widened or lengthened. These roads may have no road reserve and may be wider than 8m in some parts.
Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
Listing Notice 3 GN R324	The development of a road wider than 4 metres with a reserve less than 13,5 metres	Internal and external access roads will be constructed, which are

Activity 4	(g) Northern Cape (ii) Outside urban areas	wider than 4 m. The site falls outside of an urban area.
Listing Notice 3 GN R324 Activity 10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (g) Northern Cape (ii) Outside urban areas	The proposed switching station is likely to require the use of diesel/gas transformer oils/other hazardous substances during the operational phase.
Listing Notice 3 GN R324 Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (g) Northern Cape (i) All areas outside of urban areas;	The proposed development may require the clearance of natural vegetation in excess of 300 m2 in areas of natural vegetation.
Listing Notice 3 GN R324 Activity 14	The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) Northern Cape (ii). Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	Infrastructure associated with the OHPL may be constructed within 32 m of a watercourse, measured from the edge of the watercourse. The proposed grid connection corridor considered here does not include any CBA1 or CBA2 areas but is positioned wholly within an area classified as an ESA. This ESA is largely due to the presence of the Platberg-Karoo Conservancy IBA
Listing Notice 3 GN R324 Activity 18	The widening of a road by more than 4 metres or the lengthening of a road by more than 1 kilometre (g) Northern Cape (bb) National Protected Area Expansion Strategy Focus areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	It may be the case that existing roads will need to be widened or lengthened within a ESAs during construction of the access and servitude roads.
Listing Notice 3 GN R324 Activity 23	The expansion of— (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;	The construction of the OHPL may include the expansion of existing infrastructure such as roads that are located within 32 m of a watercourse and ESAs.

	where such expansion occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) Northern Cape i. Outside urban areas	

2.1 Applicable National Legislation

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed development.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
<u>The Constitution of South Africa, 1996 (Act 108 of 1996)</u> Section 24 of the Act states that everyone has the right to an environment that is not harmful to their health or well-being; to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development. Section 32 of the Act states that every person has a right to information held by the State and to information held by other people that is required in the exercise or protection of a right. Lastly, Section 33 of the Act states that everyone has a right to just and procedurally fair administrative action.	As per the Requirements of NEMA and the NEMA EIA Regulations, 2014 (as amended) alternative activities that are less taxing on the environment and resources must be investigated where possible. This BA Report will be made available for public review (as per the PPP section of this report). The Appeal Process will be described to all stakeholders through the EA notification described in the PPP section of this report.
<u>National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</u> NEMA authorises the Minister of the DEFF to issue Regulations relating to the administration of the Act[6], which has been done with the publication of the EIA Regulations, 2014 (as amended). Section 24(2) allows the Minister to identify activities which may not commence without environmental authorisation from the competent authority. This identification has been done in accordance with listing notices referred to as Listing Notice 1, Listing Notice 2 and Listing Notice 3. The NEMA also allows the Minister to determine which authority will be the competent authority to receive and evaluate applications for EAs: • Listing Notice 1 identifies activities of limited scale and effect, which need to be assessed by a fairly simple process referred to as a BA, where after a Basic Assessment Report (BAR) is submitted to the competent authority. • Listing Notice 2 identifies activities of significantly greater magnitude, which require evaluation through an initial Scoping Phase followed by an EIA and an EMPr. This process is generally referred to as the S&EIR process. • Listing Notice 3 relates to activities limited to specified geographical areas and matters of concern to the various provinces which require a BAR process to be dealt with by the provincial authority concerned.	It is the objective of this BA to align to NEMA. The NEMA is the overarching Act governing sustainable development and the NEMA principles apply to all grid infrastructure, Battery Storage and Utilities scale renewable energy projects - and any matter or activity relating to such operation. The Proposed Development triggers activities in respect of a Basic Assessment process (Listing Notice 1 and 3).Listed activities as per the EIA 2014 Regulations, as amended, have been identified.

6 Sections 24(5) and Section 44

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
Regulation 16(1) prescribes the general application requirements and states that an application for an EA must be made on the official application form obtainable from the DMRE (the competent authority) and must, amongst others, include proof of payment of the prescribed application fee. Regulation 19 provides for the submission of the BAR to the CA (DEFF) for consideration and states that the BA report must contain all the information set out in Appendix 1 to the EIA 2014 Regulations, as amended. In terms of regulation 20, the DEFF must, after considering the BAR, either accept the EA, with or without conditions, or refuse the EA. Once the EA is accepted by the CA, the Applicant must notify I&APs of the CA's decision.	
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA) As part of the waste management matters dealt with in the NEM: WA, waste activities are outlined in GN 921 of 29 November 2013[7]: List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment. GN R921 provides that the waste management activities listed in Category A and B thereof may not commence, be undertaken or conducted without a Waste Management Licence (WML). Activities listed in Category C of GN 921 may only be commenced with, undertaken or conducted in accordance with the National Norms and Standards published in terms of the NEM: WA.[8] The CA for WML Applications is the DEFF and Provincial counterparts.	A Waste Management Licence (WML) is not applicable for the proposed development. The handling and management of waste (all waste categories) has been dealt with in the attached Generic EMPr's.
National Water Act, 1998 (Act No. 36 of 1998) (NWA) In terms of the NWA, the national government, acting through the Minister of Human Settlements, Water and Sanitation, is the public trustee of South Africa's water resources, and must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons (section 3(1)). In terms of the NWA a person may only use water without a license if such water use is permissible under Schedule 1 (generally domestic type use) if that water use constitutes a continuation of an existing lawful water use (water uses being undertaken prior to the commencement of the NWA, generally in terms of the Water Act of 1956), or if that water use is permissible in terms of a general authorisation issued under section 39 (general authorisations allow for the use of certain section 21 uses provided that the criteria and thresholds described in the general authorisation is met). Permissible water use furthermore includes water use authorised by a license issued in terms of the NWA.	The proposed connection corridor only occurs within the D62D quaternary catchment of the Brak River, in the Nama Karoo Ecoregion. Thus, permanent rivers and wetlands are limited mostly to mainstem rivers such as those observed within the study area, typically only flow during extended periods of rainfall. In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment, all the watercourses within the site have been assigned a condition score of B (Nel et al. 2011), indicating that they are largely intact and of biological significance. The OHPL traverses two lower lying areas which direct water towards drainage lines through which water is channelled during rainfall events. However, based on the description of the project components when compared to the results of the aquatic baseline assessment[9] and the impacts that were evaluated, the overall risk with mitigation would below be low for the

7 Published in Government Gazette 37083
8 The following National Norms and Standards have been published: Norms and Standards for Storage of Waste, 2013 (GN 926 of 29 November 2013); Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013 (GN 924 of 29 November 2013); and Standards for Scrapping or Recovery of Motor Vehicles, 2013 (GN 925 of 29 November 2013
9 Colloty, 2020: The De Aar 2 South WEF Aquatic Impact Assessment.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
Section 21 of the NWA defines water uses which are governed in terms of the Act and for which a WUL is required. In terms of section 40(1) of the NWA "a person who is required or wishes to obtain a licence to use water must apply to the relevant responsible authority for a licence." It is not likely that Section 21 water uses will apply to the proposed development.	corridor that was assessed, particularly as the proposed route will avoid any significant alluvial and or wetland systems
National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEM:BA) The NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. SANBI website and GIS tools were utilised to determine whether any nationally protected and threatened ecosystems occur on site. Therefore, NEMA Listing Notice 3 activities have been included in the EA application and described in this BAR (Section 8.5) Two vegetation units are present in the area – Besemkaree Koppies Shrubland and Northern Upper Karoo, with Besemkaree Koppies Shrubland being on the project site and having a Least Threatened (NEMBA) or Least Concern (IUCN) conservation status. The Northern Cape Critical Biodiversity Area (CBA) informs that no CBAs occur on the project site, however it falls within an ESA mostly due to the presence of the large Important Bird Area (IBA) surrounding De Aar. The proposed development site falls within an area identified in the National Parks Area Expansion Strategy (NPAES).	The Ecology Specialist reports concludes that the proposed development would not compromise the functioning of the ESA due to its small footprint and is unlikely to disrupt broad scale ecological processes. The Ecology report confirms that no NEMBA listed flora species were found on the proposed development site during site visit, however a number of species protected in terms of the Northern Cape Nature Conservation Act, would require a permit if disturbed. NEM:BA was used to inform the activities triggered by Listing Notice 3 (refer to Table 2.1)
National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003 as amended) (NEM:PAA) The National Environmental Management Protected Areas Act (No. 57 of 2003) (NEM:PAA) concerns the protection and conservation of ecologically viable areas representative of South Africa's diversity and its natural landscapes and seascapes, and includes *inter alia*: • The establishment of a national register of all national, provincial and local protected areas; • The management of those areas in accordance with national standards; and • Inter-governmental co-operation and public consultation in matters concerning protected areas. Sections 48 to 53 of the NEM:PAA lists restricted activities that may not be conducted in a protected area. Section 48 states that no person may conduct commercial prospecting or mining activities in a: • Special nature reserve or nature reserve; • Protected environment without the written permission of the Minister and the Cabinet member responsible for minerals and energy affairs; and • Protected area referred to in Section 9:	As read in addition to the above. SANBI website and GIS tools were utilised to determine if the proposed development site overlaps with CBAs. The Regulations were utilised to determine the need for any additional listed scheduled activities under GNR 985.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
(b) world heritage sites; and (d) specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act (No. 84 of 1998);	
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) includes the use and protection of land, soil, wetlands and vegetation and the control of weeds and invader plants. This is the only legislation that is directly aimed at conservation of wetlands in agriculture. The Act contains a comprehensive list of species that are declared weeds and invader plants dividing them into three categories. These categories are as follows: • Category 1: Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible; • Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30m of the 1:50 year floodline of any watercourse or wetland; and • Category 3: Declared invader species that may remain but must be prevented from spreading. No further planting of these species is allowed. In terms of the Act, landowners are legally responsible for the control of alien species on their properties. Failure to comply with the Act may result in various infringement consequences and in some instances imprisonment and other penalties for contravening the law.	The protection of land, soil, watercourses and vegetation and the control of weeds and invader plants will be contained within impact management measures of this BAR. The Generic EMPr further mentions measures by which MTHS are legally obligated to implement.
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA): Section 38 (1) of the National Heritage Resources Act, 1999 (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed development include the following: "*(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;* *(c) any development or other activity which will change the character of a site; and* *(i) exceeding 5000 m² in extent*." The NHRA requires that a person intending to undertake such an activity must notify the relevant national and provincial heritage authorities at the earliest stages of initiating such a development. The relevant heritage authority would then in turn, notify the person whether a Heritage Impact Assessment Report should be submitted. According to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA) (now replaced by NEMA) or any other applicable legislation.	The Screening Tool Report generated for the proposed development, dated 25 February 2021, identifies the following heritage-related environmental sensitivities in relation to the project: • a High sensitivity in respect of archaeology and cultural heritage; and • a very high sensitivity in respect of palaeontology. It was confirmed that Archaeological resources are widespread but of generally limited significance in the general area of the proposed project. Although palaeontological material is likely to be present in parts of the project footprint, there is a very small chance of fossils being encountered during the construction activities The heritage impact assessment report will be submitted on the SAHRA website for comment and is included in Volume II of this BAR.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account any comments and recommendations made by the relevant heritage resources authority. As such, a Heritage Impact Assessment will form part of this Basic Assessment process. In South Africa, the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The NHRA also protects intangible heritage such as traditional activities, oral histories and places where significant events happened.	
National Road Traffic Act, 1996 (Act No. 93 of 1996) (NRTA) The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. The South African National Roads Authority (SANRAL) and the Northern Cape Department of Transport (DoT) would act as a Competent/Commenting Authority.	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits which will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads (transport vehicles exceeding the dimensional limitations (length) of 22m). Depending on the trailer configuration and height when loaded, some of the substation components and the pylons may not meet specified dimensional limitations (height and width) and will therefore require a permit.
National Forests Act, 1998 (Act No. 84 of 1998) (NFA)) and National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998). This act lists protected tree species and prohibits certain activities. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister". The purpose of the National Veld and Forest Fire Act, as amended by the National Fire Laws Amendment Act, is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of land owners. The term 'owners' includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority. The requirements include, but are not limited	A licence is required for the removal of protected trees. It is therefore necessary to conduct a pre-construction walkthrough survey that will determine the number and relevant details pertaining to protected tree species present in the grid connection corridor that cannot be reasonably avoided for the submission of relevant permits to authorities prior to the disturbance of these individuals.

<table>
<tr><th>Applicable National Legislation and Guidelines used to compile the report.</th><th>Reference where Applied</th></tr>
<tr><td>to, the maintenance of firebreaks and availability of firefighting equipment to reasonably prevent the spread of fires to neighbouring properties.</td><td></td></tr>
<tr><td><u>Hazardous Substances Act, 1973 (Act No. 15 of 1973)</u>
The Regulations for Hazardous Chemical Substances apply to an employer or a self-employed person who carries out work at a workplace which may expose any person to the intake of hazardous chemical substances at that workplace. Regulations 14 and 15 provide for the labelling, packaging, transportation and storage and the disposal of hazardous chemical substances respectively. These regulations set out specific requirements which form part of an employer's duty to provide and maintain, as far as reasonably practicable, a working environment that is safe and without risk to the health of his or her employees.</td><td>The proposed switching station is likely to require the use of transformer oils/other hazardous substances during the operational phase.</td></tr>
<tr><td><u>Promotion of Access to Information Act, 2000 (Act No. 2 of 2002) (PAIA)</u>
The PAIA gives effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.</td><td>The requirements of the Act were considered when assessing and involving the public and registered interested and affected parties.</td></tr>
<tr><td><u>National Dust Control Regulations, 2013</u>
The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004), makes provision for national dust control regulations. These regulations prescribe dust fall standards for residential and non-residential areas. These Regulations also provide for dust monitoring, control and reporting.
The acceptable dust fall rates are:
<table>
<tr><th>Restriction Area</th><th>Dust Fall (D) (mg/m^2/day, 30 day average)</th><th>Permitted Frequency of exceedance</th></tr>
<tr><td>Residential</td><td>D<600</td><td>Two within a year, not sequential months</td></tr>
<tr><td>Non- Residential</td><td>600 <D< 1200</td><td>Two within a year, not sequential months</td></tr>
</table>
</td><td>The proposed development is cognisant of the obligation to control dust and particulate matter (PM) 10 and 2.5 which may result from the proposed development.
Principles of this plan have been taken into consideration during the compilation of this BAR.</td></tr>
<tr><td><u>The National Development Plan, 2030</u>
The NDP strives to ensure a tightening of the accountability chain, where, in relation to this BAR, environmental non-compliance in terms of Section 16(1)(b) of NEMA, is addressed at all levels of government.
The environmental sustainability and resilience objectives include, inter alia:
• Implementing a set of indicators for natural resources, accompanied by publication of annual</td><td>The project – if approved – will assist in minimising GHG emissions as the proposed development is critical to the successful operation of the approved Mulilo Total Hydra Storage Project, which is a green energy/renewable energy project.
If awarded preferred bidder status, the Mulilo Total Hydra Storage Project will provide a constant and clean electricity feed to the national grid.</td></tr>
</table>

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
• compliance reports; • Achieving the peak (in 2025) plateau and decline trajectory for greenhouse gas (GHG) emissions coupled with the entrenchment of an economy-wide carbon price; • Improving disaster preparedness for extreme climate events. The Northern Cape is currently experiencing a drought; and • Increasing investment in new agricultural technologies, research and the development of adaptation strategies for the protection of rural livelihoods and expansion of commercial agriculture.	
The One Environmental System In terms of the One Environmental System established by the NEMLAA, an EA decision in respect of the proposed development must be issued within 107 days from receipt of the BAR. This system aims to streamline the licensing processes for environmental authorisations and water use.	It is the intention of the EAP on behalf of MTHS (the Applicant) to submit the required documents within the prescribed timeframes. The Competent Authority is identified as the DEFF.
The Public Participation Guidelines in terms of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations, 2017 This document aims to assist with the participation process of all interested and affected parties regarding any proposed development. This guideline provides information and guidance for proponents or applicants, interested and affected parties, competent authorities and environmental assessment practitioners on the public participation requirements of the act, as well as provides information on the characteristics of a vigorous and inclusive public participation process.	This guideline was used to ensure that all of the required steps are followed to ensure that a complete and successful public participation process is conducted.
Integrated Environmental Management Guideline on Need and Desirability, 2017 This document assists Environmental assessment practitioners on the best practice as well as how to meet the peremptory requirements prescribed by the legislation as well as sets out both the strategic and statutory context for the consideration of the need and desirability of a development involving any one of the NEMA listed activities. This document further sets out a list of questions which should be addressed when considering need and desirability of a proposed development.	This guideline was used to ensure that the need and desirability of the proposed development was correctly and thoroughly considered.
Action Plan of the Environmental Initiative of the New Partnership of Africa's Development, 2003. This Action Plan was established with the aim of encouraging sustainable development, conservation and acceptable use of biodiversity in Africa. It has been recognised that a healthy and productive environment is a prerequisite for the success of New Partnership of Africa's Development (NEPAD), together with the need to systematically address and sustain ecosystems, biodiversity and wildlife. Six areas have been identified: • Combating land degradation, drought and desertification;	The prevention and control of IAS has been described in this BAR. In addition, the proposed development is not reliant of large amounts of water for construction, operation or decommissioning and would thus not contribute to drought or desertification. Suitable buffers around the secondary watercourses occurring within 500m from the proposed development site have been outline in the Aquatic Specialist Report.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
• Conserving Africa's wetlands; • Preventing and controlling invasive alien species (IAS); • Conservation and sustainable use of coastal and marine resources; • Combating climate change in Africa; and • Cross-border conservation and management of natural resources.	
South Africa's National Biodiversity Strategy and Action Plan The National Biodiversity Strategy and Action Plan (NBSAP) sets out a framework and a plan of action for the conservation and sustainable use of South Africa's biological diversity and the equitable sharing of benefits derived from this use. The NBSAP was prepared by the former Department of Environmental Affairs and Tourism (DEAT), during the period May 2003 to May 2005. The goal of the NBSAP is to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future. Through the NSBA, it is recognised that biodiversity cannot be conserved through protected area networks only. All stakeholders, from private landowners and communities to business and industry must get involved in biodiversity management.	The proposed development is cognisant of the obligation to protect and preserve the integrity of the environment as well as its biodiversity. Principles of this plan have been taken into consideration during this BAR.
National Environmental Management Act; National Appeal Regulations, 2014 The purpose of these regulations is to regulate the procedure contemplated in section 43(4) of the National environmental management act relating to the submission, processing and consideration of a decision on an appeal. This Act is used to help guide and understand the appeal process and the procedures may follow.	The requirements of the Act will be considered if an appeal may need to be or is lodged for the project.

2.2 Provincial Legislation

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed development.

Applicable Provincial Legislation and Guidelines used to compile the report.	Reference where Applied
The Nature and Environmental Conservation Ordinance No. 19 of 1974; and Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009). The competent or commenting authority is the Northern Cape DENC. These were developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered and species are listed in the relevant documents. The provincial environmental authorities are responsible for the issuing of permits in terms of this legislation	The proposed development is cognisant of the obligation to protect and preserve the integrity of the environment as well as its biodiversity. Principles of this plan have been taken into consideration during this BAR.

Applicable Provincial Legislation and Guidelines used to compile the report.	Reference where Applied
Northern Cape Provincial Spatial Development Framework (PSDF), 2012 The PSDF states that the main goal for the province is to enable sustainability through sustainable development. The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. With this, the overall energy objective of the Norther Cape Province includes *"includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts."*	The proposed development (which supports the successful operation of the approved Mulilo Total Hydra Storage Project) will enable additional uptake of renewable energy into the national grid which will promote the province's objectives.

In addition to the above, the renewable energy industry has substantial support in the South African planning context, which is detailed in the following national and provincial plans:

- National Development Plan;
- National Integrated Energy Plan (2016)
- Renewable Energy Development Zones (REDZ) as read in GNR 114 and GNR 113 of 16 February 2018;
- National Integrated Resource Plan for Electricity (2010-2013); and
- National Infrastructure Plan.

2.3 Regional Programmes and Frameworks

An evaluation of the 'need and desirability' of the project (Section46) considers the strategic context of the project with regard to the municipal Integrated Development Plans (IDPs), Environmental Management Frameworks (EMFs) and Spatial Development Frameworks (SDFs) as follows:

Applicable Regional IDPs, SDFs and EMFs.	Reference where Applied
Emthanjeni Local Municipality Draft IDP (2018-2019) Emthanjeni has in recent time seen the influx of investment in Renewable energy projects and is a potential industrial growth point with ample industrial sites, reasonable prices and tariffs, affordable labour and the necessary infrastructure. The Emthanjeni Local Municipal Integrated Development Plan, indicates that the one of the strategic objective in terms of provision of access to all basic services rendered to residents within the available resources includes renewable energy projects, with a target of 500.	The proposed development indirectly supports the municipalities strategic objective through the Mulilo Total Hydra Storage Project, should this project be awarded preferred bidder. Should the Mulilo Total Hydra Storage Project be awarded preferred bidder status, it may also be confirmed as a Strategic Infrastructure Project (SIP).
Pixley ka Seme District Municipality IDP (2017 – 2022)	As mentioned in the IDP, Favourable conditions present a competitive advantage for the district. It is the intention of the

Applicable Regional IDPs, SDFs and EMFs.	Reference where Applied
Section 4 of the IDP highlights the districts development strategies for period 2017 – 2022. In terms of local economic development (Economic Infrastructure) it is the municipalities strategic objective to: • The proportion of people with access to the electricity grid should rise to at least 90% by 2030, with non-grid options available for the rest; • Promote economic growth in the district; and • Monitor and support local municipalities to enhance service delivery. In terms of Environmental Sustainability and resilience, the district aims for: • At least 20 000MW of renewable energy contracted by 2030 – 9 years' time.	proposed development to contribute to fulfilling the relevant strategic objectives of the district.
<u>Pixley ka Seme District Municipality SDF (2013 - 2018)</u> The principles as included in the Northern Cape PSDF, 2012, in relation to energy generation in the district, are as follows: • Use renewable resources in preference to non-renewable resources; • Invest a meaningful share of the proceeds from the use of non-renewable resources in • social and human-made capital, to maintain the capacity to meet the needs of future • generations Embracing roads (N1 + N10 + N12) and Renewable Energy have been identified as key SDF opportunities for the district. It is the intention of the District, through the built environment, to *"Support the potential opportunities presented by the identification of a renewable energy hub in the region to utilise the climate as an alternative resource for the generation of power, income and an economic growth stimulant".*	The proposed development is located within an area identified in the SDF as a "Renewable Energy Hub". This hub extends from the west coast right up to the De Aar region and can accommodate special economic development within the zone earmarked and entails a 100km wide zone. The proposed development falls within this 'hub' and is thus aligned to the districts investment in renewable energy.

3 METHODOLOGY

A Basic Assessment is a consolidation of the two phases of an EIA process into a single phase and involves the identification and assessment of potential impacts associated with a proposed development. Plate 3.1 below provides a brief summary of the methodology that is applied in conducting the BA process.

The primary objective of the basic assessment (BA) process is to present sufficient information to the competent authority and interested and affected parties (I&APs) on predicted impacts and associated mitigation measures required to avoid or mitigate negative impacts, as well as to improve or maximise the benefits of the project.

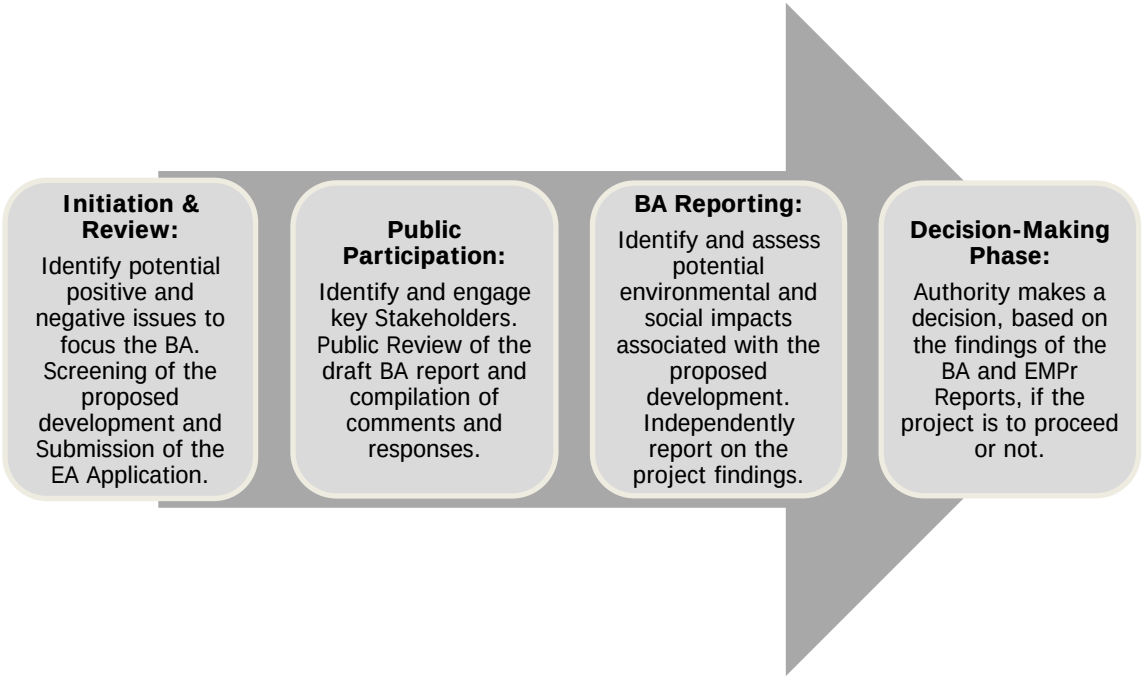

Plate 3-1: Summarised Methodology applied to conducting a BA process

3.1 NEMA Requirements

In terms of legal requirements, NEMA EIA Regulations 2014, as amended, regulate and prescribe the content of the BA Report and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 3.1 shows how, and where, the legal requirements are addressed in this BA Report. Section 4 of this BA report provides a summary of the Public Participation Process (PPP) and Appendix C of this BA Report contains the Public Participation undertaken to date. As comments are received on the BA Report these will be collated and included in Appendix C of this BA Report.

As per the EIA Regulations 2014, as amended, "*the objective of the basic assessment process is to, through a consultative process-*

a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
b) identify the alternatives considered, including the activity, location and technology alternatives;
c) describe the need and desirability of the proposed alternatives;
d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and

locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine-

i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
ii. the degree to which these impacts-
(aa) can be reversed;
(bb) may cause irreplaceable loss of resources; and
(cc) can be avoided, managed or mitigated; and

e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to-

i. identify and motivate a preferred site, activity and technology alternative;
ii. identify suitable measures to avoid, manage or mitigate identified impacts; and
iii. identify residual risk that need to be managed or monitored.

The above activities are completed through consultation with:

- The lead authorities involved in the decision-making for the BA application (in this case, the DEFF);
- The I&APs, provincial and local governments, and other relevant organisations to ensure that local issues are well understood; and
- The specialist team to ensure that technical issues are identified.

The existing environment within which a proposed development is to be located has been taken from the original specialist assessment and basic assessment report, compiled by Arcus (2021) for the De Aar 2 South WEF Grid Connection.

A primary objective is to present key stakeholders with the findings of the assessments, obtain and document feedback, and address all issues raised.

Table 3.1: Legislative Requirements for Scope of Assessment and Content of Basic Assessment Reports

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	**Location in BAR**
A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-	
details of- *(i) the EAP who prepared the report; and* *(ii) the expertise of the EAP, including a curriculum vitae;*	Executive Summary, Table G Appendix A
the location of the activity, including- *(i) the 21 digit Surveyor General code of each cadastral land parcel;* *(ii) where available, the physical address and farm name;* *(iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;*	Executive Summary, Table A
a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is- *(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or*	Figure i Table B, Table C, Table D and Table E

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	**Location in BAR**
(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
a description of the scope of the proposed activity, including- *(i) all listed and specified activities triggered and being applied for; and* *(ii) a description of the activities to be undertaken including associated structures and infrastructure;*	Table 2.1 Section 7
a description of the policy and legislative context within which the development is proposed including- *(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and* *(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools framework, and instruments;*	Section 2 Section 6
a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 6
a motivation for the preferred site, activity and technology alternative;	Section 8
a full description of the process followed to reach the proposed preferred alternative within the site, including- *(i) details of the alternatives considered;*	Section 6
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 4 Appendix C
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 4 Appendix C
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 5
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- *(aa) can be reversed;* *(bb) may cause irreplaceable loss of resources; and* *(cc) can be avoided, managed or mitigated;*	Section 9 Section 10
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 3.2 Volume II
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9 Section 10
(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 9 Section 10
(ix) the outcome of the site selection matrix;	Section 7

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	**Location in BAR**
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 7
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 7 Section 8
a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including - *(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and* *(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;*	Section 3 Section 9
an assessment of each identified potentially significant impact and risk, including- *(i) cumulative impacts;* *(ii) the nature, significance and consequences of the impact and risk;* *(iii) the extent and duration of the impact and risk;* *(iv) the probability of the impact and risk occurring;* *(v) the degree to which the impact and risk can be reversed;* *(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and* *(vii) the degree to which the impact and risk can be avoided, managed or mitigated;*	Section 9 Section 10
where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 11 Volume II
an environmental impact statement which contains- *(i) a summary of the key findings of the environmental impact assessment;* *(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and* *(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;*	Section 11 Figure 11.1 (a-d) and Figure 11.2 (a-c)
based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management outcomes, and the impact management outcomes for the development for inclusion in the EMPr;	Section 9 Appendix B
any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 11
a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.3

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 11 Section 13
where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Commencement of construction will occur within 10 years of authorisation and conclude within 5 years of commencement. Post-construction monitoring requirements will be finalised within this period.
an undertaking under oath or affirmation by the EAP in relation to- *(i) the correctness of the information provided in the reports;* *(ii) the inclusion of comments and inputs from stakeholders and I&APs;* *(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and* *(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; and*	Appendix A
where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	n/a
any specific information that may be required by the competent authority; and	n/a
any other matters required in terms of section 24(4)(a) and (b) of the Act.	n/a

3.2 Basic Assessment Timeframes

Broadly speaking, a BA report is based on information that is readily available. A BA report does not require a separate scoping phase since the issues, impacts and solutions associated with the activity are known with relative certainty and the environmental risks are manageable. As such, the timeframes, from the date of application to EA decision, are shorter - typically 197 days from the date of application (Plate 3.2).

3.3 Environmental Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16 (1)(b)(v) of the EIA Regulations, 2014 (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of BA and EIA applications in terms of Regulation 19 and 21 of EIA Regulations, 2014 (as amended). The Screening Report generated for the proposed development is submitted to the DEFF as an appendix in the application form.

The screening report identified Solar PV / CSP Developments which received environmental authorisation within a 30km radius of the proposed development. No intersections with Environmental Management Frameworks (EMF) were found. In terms of development incentives, restrictions, exclusions or prohibitions, the site falls within the Strategic Transmission Corridor – specifically the Central Corridor.

In line with best practice, a 200 m buffer was applied to the Grid connection, a 500m buffer to the switching station and a 500 m applied to the road when generating the screening tool reports.

Table 3.2 provides a summary of the specialist assessments identified by the screening report, and the response to each assessment in terms of the proposed development.

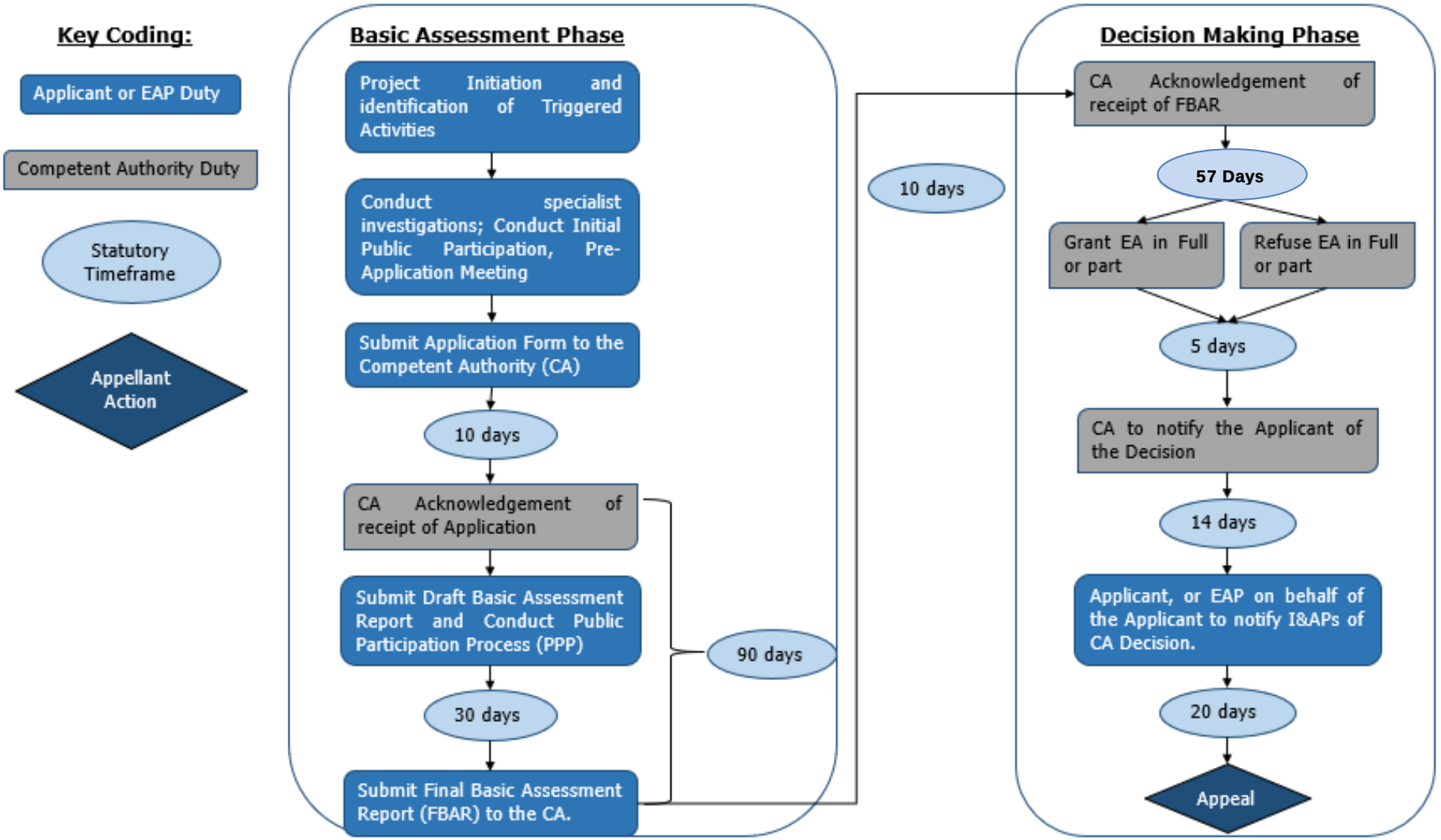

Plate 3-2: Basic Assessment statutory timeframes and process

Table 3.2: Specialist assessments identified in terms of the national web-based screening tool for the proposed development

Identified Specialist Assessment	Identified Sensitivity	Specialist confirmation of the DEFF Screening Tool Findings	Reference in text
Agricultural Impact Assessment	**Medium**	The proposed site is identified by the screening tool as being of low and medium sensitivity for impacts on agricultural resources. The specialist **agrees** with the agricultural sensitivity identified by the screening tool. The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall and high evaporation) proves the area to be arid, and therefore of limited land capability. In addition, the land type data shows the dominant soils to be shallow soils on underlying rock or hard-pan carbonate. The land of the study area, therefore, without doubt, corresponds to the definitions of the screening tool sensitivity categories of low and medium in terms of its land capability and cultivation status.	Refer to Chapter 9 – 12 as well as Volume II.
Plant Species Assessment	**Low**	The specialist **agrees** that the sensitivity rating can be assigned a Low status. The Screening Tool was appropriate and therefore a Plant Species Compliance Statement applies. This statement can be compiled by the EAP.	Refer to Chapter 9 – 12 as well as Volume II.
Animal Species Assessment	**Medium**	The Medium Terrestrial Animal Species sensitivity identified by the Screening Tool may be overly simplistic. The specilist **neither Agrees or disagrees** with the screening tool findings. A Terrestrial Animal Species Specialist Assessment should be conducted to produce a finer-scale terrestrial animal sensitivity map. This is due to the folloing reasons: • available habitats available in the proposed development footprint, • the position of the proposed grid corridor adjacent to existing electricity transmission infrastructure, • the proximity of the proposed project site to the town of De Aar and • the relative size of the proposed site in the context of the broader area, which comprises large areas of mostly untransformed and contiguous habitat. Furthermore the confirmed presence of Ludwig's Bustard in the surrounding area, and the relative importance of the broader area as a breeding area for this species makes it likely that the species may either be present on the project site occasionally or traverse the project site while commuting to or from lekking areas in the broader area. Therefore a Terrestrial Animal Species Specialist Assessment is applicable.	Refer to Chapter 9 – 12 as well as Volume II for the Terrestrial Animal Species Specialist Assessment.

Identified Specialist Assessment	Identified Sensitivity	Specialist confirmation of the DEFF Screening Tool Findings	Reference in text
Terrestrial Biodiversity Impact Assessment	**Very High**	The specialist **agrees** with the findings of the DEFF Screening Tool sensitivity rating for Terrestrial Biiodiversity. The results from the desk-top study, GIS and satellite mapping and site visit indicate that the reccommendations of the Terrestrial Biodiversity protocol as gazetted are appropriate, that the site can be returned to its current state within two years of the completion of the construction phase and therefore a compliance statement applies.	Refer to Chapter 9 – 12 as well as Volume II.
Aquatic Biodiversity Impact Assessment	**Very High**	The DEFF Screening Tool identified one sensitivity rating within the development footprint, namely, Very High. Although there is some overlap with the findings on site and the Screening Tool's outcome, the development footprint contains only limited areas of High Sensitivity (with the remaining areas being low sensitivity) that were identified following the undertaking of a site visit and spatial input considerations. Based on the above outcomes, the specialist **agrees** the environmental sensitivities identified on site, informed by a site visit undertaken by Dr Brian Colloty in September 2019 would be rated HIGH and LOW .	Refer to Chapter 9 – 12 as well as Volume II.
Archaeological and Cultural Heritage Impact Assessment	**High**	The DEFF Screening Tool sensitivity rating confirms that the area around the Grid Interconnection, switching station and new access road is of archaeological and cultural heritage significance, however the specialist **disagrees** with the significance ratings ascribed and would instead rate significance as **moderate/medium** with individual sites potentially being higher or lower significance	Refer to Chapter 9 – 12 as well as Volume II.
Palaeontology Impact Assessment	**Very High**	The specialist **agrees** with the palaeontological significance rating of the DEFF screening tool. However, previous palaeontological assessments in the area, including the PIA for the De Aar 2 South WEF Grid Connection (Bamford 2020) which covers the Grid Interconnection, have indicated that there is little exposure at or near the surface of fossiliferous rock strata and the chances of the Grid Interconnection, switching station and new access road encountering fossils is unlikely.	Refer to Chapter 9 – 12 as well as Volume II

Identified Specialist Assessment	Identified Sensitivity	Specialist confirmation of the DEFF Screening Tool Findings	Reference in text
Defence Theme	**Very High**	Defence Theme was listed as having a very high sensitivity as it is within the vicinity of a military and defence site. As no specific assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and must comply with Appendix 6 of the Environmental Impact Assessment Regulations promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (The Act), where a specialist assessment is required. The EAP acting on behalf of the Applicant is required to submit a Statement to the Civil Aviation Compliance Statement (CAA) acting on behalf of the Defence Force / Military. The SA Army Foundation (Britstown, De Aar) was notified during the initial notification period, and has been provided with the opportunity to comment on the draft BAR. Comments received during this review period will be captured in the comments and responses report, to be submitted with the final BAR	Refer to Appendix C.
Civil Aviation Assessment	**High**	CAA Theme was listed as having a high sensitivity as the infrastructure lies within 8 km of other civil aviation aerodrome. With the current rating, the EAP acting on behalf of the Applicant is required to submit a submit a Civil Aviation Compliance Statement (CAA). The CAA was notified during the initial notification period, and has been provided with the opportunity to comment on the draft BAR. Comments received during this review period will be captured in the comments and responses report, to be submitted with the final BAR. Should permits be required, these will be applied for accordingly In terms of a Civil Aviation Assessment, no assessment is required. Note: CAA approval was obtained in 2013 (Ref: CAA_2012_W0149) for the Authorised DA2S WEF site as well as the DA2S WEF Grid Connection.	Initial comment has been provided by the EAP, refer to Appendix C.

3.4 Specialist Methodology

To evaluate the potential environmental impacts and verify the sensitivity of the screening report, information relating to the existing environmental conditions was collected through field and desktop research; this is known as the baseline. The environment described in the DA2S WEF Grid Connection (DEFF Reference Number to be confirmed, Arcus 2021) Report was used to inform the baseline for this basic assessment as the same environment was assessed. Each of the specialist assessments followed a systematic approach to the assessment of impacts, with the principal steps being:

- Description of existing environment/baseline conditions;
- Site Sensitivity Verification;
- Prediction and Assessment of likely potential impacts, including cumulative impacts (both positive and negative);
- Identification of appropriate mitigation measures; and
- Assessment of residual (potential) environmental impacts.

Where no specialist was appointed, the EAP conducted high level screening to confirm the significance ratings of the impacts the proposed development may have on the environment, by:

- Desk top based reviews of literature available on the proposed site; and
- Reviewing the previous applications, such as for the DA2S WEF and DA2S WEF Grid Connection, within the affected area.

Based on the results of the DEFF screening report[10], referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended, soil and agriculture, aquatic, ecological, avifauna and heritage specialist studies were conducted for this proposed development.

For this basic assessment report, specialists were requested to confirm the findings of the 200 m corridor that was assessed as part of the DA2S WEF Grid Connection report and present their findings in the form of a statement which includes: Mapping, a short summary of the receiving environment, impacts and assessment tables and mitigation measures for the inclusion in the EMPr as well as sensitivity mapping. This was a desk-top study based on previous specialist experience of the site and the area.

3.4.1 Soils and Agriculture

The assessment was based on a desktop analysis of existing soil and agricultural potential data and other data for the site, which is considered extensive and more than adequate for a thorough assessment of all the agricultural impacts of the proposed development. A field investigation was not considered necessary due to the low agricultural sensitivity of the site.

The ratings of impacts were based on the specialist's knowledge and experience of the field conditions of the environment in which the proposed development is located, and of the impact of disturbances on that agricultural environment.

The specialist statement included in this Basic Assessment Report confirms that the methodology undertaken as part of the DA2S WEF Grid Connection report above still holds relevance for this application.

[10] The DEFF Screening Report will be submitted to the Competent Authority with the Application Form for this Proposed Development.

3.4.2 Freshwater and Wetlands (Aquatic)

The original DA2S WEF Grid Connection assessment included delineating any natural waterbodies, and assessing the potential consequences of the proposed alignment (inclusive of a 500m wide corridor – The study area) on the surrounding watercourses. This was based on information collected during various site visits conducted within the region (i.e. adjoining farms and or projects directly adjacent to study area) in August 2014, May 2016 for surrounding projects, and a site-specific assessment in October 2019.

The specialist statement included in this Basic Assessment Report confirms that the methodology undertaken as part of the DA2S WEF Grid Connection report above still holds relevance for this application

3.4.3 Terrestrial Ecology (Fauna and Flora)

Following the protocol listed in National Gazette, No. 43110 of 20 March, 2020, when applying for Environmental Authorisation, the information presented by the DEFF online screening tool was consulted to determine the sensitivity of the project site prior to the field site visit and ground-truthing. Existing studies and various databases of distribution records were also consulted to determine the potential species of flora and fauna that could occur on the site. In addition to the desktop study, a five-day site walkthrough covering the power line corridor and switching station was conducted between 10 and 14 February 2020.

The specialist statement included in this Basic Assessment Report confirms that the methodology undertaken as part of the DA2S WEF Grid Connection report above still holds relevance for this application.

An external specialist review was conducted on the Ecological Impact Assessment Report. Following the review, the report was updated based on comments from the reviewer (Volume II).

3.4.4 Avifauna

While no specific protocols for the avifaunal assessment of linear infrastructure are listed in the National Gazette, No. 43110 of 20 March, 2020, the information presented by the online screening tool was consulted to determine the sensitivity of the project site prior to the field site visit and ground-truthing. A five-day site walkthrough covering the power line corridor and switching station was conducted between 10 and 14 February 2020. Databases were also studied to gain an understanding of the project baseline for avifauna. Available bird micro-habitats were assessed and a list of all bird species was recorded.

The specialist statement included in this Basic Assessment Report confirms that the methodology undertaken as part of the DA2S WEF Grid Connection report above still holds relevance for this application.

An external specialist review was conducted on the Avifaunal Impact Assessment Report. Following the review, the report was updated based on comments from the reviewer (Volume II).

3.4.5 Heritage, Archaeology and Palaeontology

The assessment comprised an archaeological walkover survey and impact assessment of the proposed development site, a desktop palaeontological impact assessment (PIA) and the production of an integrated heritage impact assessment (HIA) which addresses the impacts of the project on heritage resources.

The specialist statement included in this Basic Assessment Report confirms that the methodology undertaken as part of the DA2S WEF Grid Connection report above still holds relevance for this application

3.5 Identification of Potential Impacts

The identification of potential impacts covers the three phases of the proposed development: construction, operation and decommissioning. During each phase, the potential environmental impacts may be different.

The project team has experience from environmental studies for other projects in the locality of the proposed development as well as other WEF and Grid Connection applications. The team is, therefore, able to identify potential impacts addressed in the BA based on their experience and knowledge of the type of development proposed and the local area. Their inputs informed the scope for the BA.

Each specialist assessment considered:

- The extent of the impact (local, regional or (inter) national);
- The intensity of the impact (low, medium or high);
- The duration of the impact and its reversibility;
- The probability of the impact occurring (improbable, possible, probable or definite);
- The confidence in the assessment; and
- Cumulative impacts.

Following identification of potential environmental impacts, the baseline information was used to predict changes to existing conditions and undertake an assessment of the impacts associated with these changes.

3.5.1 Assessment of Potential Effects

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity and importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (and importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use.

The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e. sensitivity/importance and predicted degree of alteration from the baseline).

Specialists, in their terms of references for the DA2S WEG Grid Connection, were supplied with a standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making. Specialist were commissioned to confirm that their methods and findings are still relevant for this application. The methodology[11] as outlined below indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the EIA Regulations, 2014 (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

[11] Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

3.5.1.1 Extent (spatial scale)

L	M	H
Impact is localised within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

3.5.1.2 Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium-term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

3.5.1.3 Intensity (severity)

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g. pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement

3.5.1.4 Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

3.5.1.5 Status of the Impact

The specialist should describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

3.5.1.6 Degree of Confidence in Predictions:

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, is to be stated.

3.5.1.7 Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L				
Duration	**H**			
	M			Medium
	L	Low		
Intensity = M				
Duration	**H**			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	**H**			
	M			High
	L	Medium		
		L	**M**	**H**
		Extent		

Positive impacts are ranked in the same way as negative impacts but result in high, medium or low positive consequence.

3.5.1.8 Overall Significance of Impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	**Definite Continuous**	H	MEDIUM		HIGH
	Possible Frequent	M		MEDIUM	
	Unlikely Seldom	L	LOW		MEDIUM
			L	M	H
			CONSEQUENCE		

3.5.1.9 Mitigation Measures

Measures to avoid, reduce or remedy significant adverse impacts identified, are termed mitigation measures. Where the assessment process identifies any significant adverse impacts, mitigation measures are proposed to reduce those impacts where practicable. Such measures include the physical design and operational measures. Design alterations such as the route of the servitude to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e. embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and

- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation measures (where relevant) (Section 9 and 10 of this report).

3.6 Cumulative Impact Assessment

In accordance with the EIA Regulations, 2014 (as amended), consideration should also be given to 'cumulative impacts'.

By definition, cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the proposed development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis.

For the purpose of this assessment, cumulative impacts are defined and have been assessed in the future baseline scenario, i.e. cumulative impact of the proposed development = change caused by the proposed development when added to the cumulative baseline (which includes all other identified relevant developments). In the cumulative assessment, the effect of adding the proposed development to the cumulative baseline is assessed.

The selection of projects to be included in the assessment of cumulative impacts, was based on the knowledge and status of the surrounding areas at the time of writing the BA Report (Figure 3.1 Cumulative Developments and Grid Interconnection within up to 35 km of the proposed development), and the applicable renewable energy projects and existing Grid Interconnection are given in tables 3.3 and 3.4 respectively.

Each of the specialists used existing publicly available information for the relevant developments that occur within an up to 35 km radius of the proposed development, in order to assess the cumulative impacts. Cumulative impacts that have been considered are those residual impacts that remain medium to high post-mitigation and are highly qualitative and based on specialists' and EAPs knowledge.

Table 3.3 List of Renewable Energy Projects within up to 35 km of the Proposed Development

No.	DEFF Reference No.	Classification	Status of Project
1	12/12/20/2250/3	Solar PV	Approved
2	14/12/16/3/3/2/382/6	Solar PV	Approved
3	12/12/20/2048/2	Solar PV	Approved
4	14/12/16/3/3/2/382/3	Solar PV	Approved
5	12/12/20/2048/1	Solar PV	Approved
6	12/12/20/2250/4/AM4	Solar PV	Approved
7	14/12/16/3/3/2/382/2	Solar PV	Approved
8	12/12/20/2025/1	Solar CSP	Approved
9	14/12/16/3/3/2/382/5	Solar PV	Approved
10	12/12/20/2500	Solar PV	Approved
11	12/12/20/2250/5	Solar PV	Approved
12	12/12/20/2177	Solar PV	Approved
13	12/12/20/2025	Solar CSP	Approved
14	12/12/20/2048/3	Solar PV	Approved

15	14/12/16/3/3/2/740	Solar PV	Approved
16	14/12/16/3/3/2/382/4	Solar PV	Approved
17	12/12/20/2048/4	Solar PV	Approved
18	12/12/20/2250	Solar PV	Approved
19	12/12/20/2250/2	Solar PV	Approved
20	14/12/16/3/3/2/403	Solar PV	Approved
21	12/12/20/2250/1	Solar PV	Approved
22	12/12/20/2250/4	Solar PV	Approved
23	12/12/20/2498/AM3	Solar PV	Approved
24	12/12/20/2025/2/A	Solar PV	Approved
25	14/12/16/3/3/2/382/1	Solar PV	Approved
26	12/12/20/1673	Solar PV	Approved
27	14/12/16/3/3/2/382/7	Solar PV	Approved
28	12/12/20/2025/2	Solar PV	Approved
29	12/12/20/2463/1/AM7	WEF	Approved

Although majority of these projects are Solar Energy Facilities, the impacts of these developments are relevant as the majority also include associated power line and electrical infrastructure as they influence the various specialist cumulative impact assessments for the proposed development.

Table 3.4 List of Existing Electrical Grid Infrastructure within up to 35 km of the Proposed Development

Name	Line Start	Line End	Line Status	Line kV
Hydra Kronos 1	Hydra	Kronos	Existing	400 kV Line
Hydra Poseidon 1	Hydra	Poseidon	Existing	400 kV Line
Hydra Poseidon 2	Hydra	Poseidon	Existing	400 kV Line
Beta Hydra 1	Beta	Hydra	Existing	400 kV Line
Hydra Perseus 2	Hydra	Perseus	Existing	400 kV Line
Beta Hydra 2	Beta	Hydra	Existing	765 kV Line
Hydra Roodekuil 2	Hydra	Roodekuil	Existing	220 kV Line
Hydra Roodekuil 1	Hydra	Roodekuil	Existing	132 kV Line
Hydra Ruigtevallei 1	Hydra	Ruigtevallei	Existing	220 kV Line
Hydra Ruigtevallei 2	Hydra	Ruigtevallei	Existing	220 kV Line
Droerivier Hydra 1	Droerivier	Hydra	Existing	400 kV Line
Droerivier Hydra 3	Droerivier	Hydra	Existing	400 kV Line
Hydra Perseus 3	Hydra	Perseus	Existing	400 kV Line
Droerivier Hydra 2	Droerivier	Hydra	Existing	400 kV Line
Gamma Perseus 1	Gamma	Perseus	Existing	765 kV Line
Gamma Hydra 1	Gamma	Hydra	Existing	765 kV Line
Hydra Ndhlovu	Hydra	Ndhlovu	Existing	132 kV Line

4 PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) follows the requirements of Section 24 (5) and Chapter 6 (41, 42, 43, and 44) of GN R. 326 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), as well as the Public Participation Guidelines in terms of NEMA, 1998 EIA Regulations, 2014.

Due to the National COVID-19 Pandemic the DEFF published Government Notice 43412 on 5 June 2020. Included in this notice was the requirement to submit a Public Participation (PP) Plan to the DEFF prior to the commencement of a PP Process. The PP Plan was compiled by Suzanna Nel of Landscape Dynamics and was designed to show how the EAP aims to provide sufficient and accessible information to all Interested and Affected Parties (I&APs) in a safe manner during National COVID-19 Pandemic. This plan was submitted and approved by the DEFF on 14 January 2020. A copy of this is being submitted with the application form to the DEFF. If any new regulations or notices are published before the commencement of the PP Process for this application, these will be taken into consideration.

The primary aims of the public participation process are:

- To inform Interested and Affected Parties (I&APs) of the proposed development;
- To identify issues, comments and concerns as raised by I&APs;
- To promote transparency and an understanding of the project and its potential consequences;
- To facilitate open dialogue and liaise with all I&APs;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed development; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in a Comments & Response Report.

The latest I&AP database of the authorised DA2S WEF, Badenhorst Solar PV2, Badenhorst Solar PV3, De Aar PV1 and the DA2S WEF Grid Connection was used as the baseline for this BA report. This database is extensive and has been compiled and revised over a number of years. As part of the Initial Notification, notices were placed in the Volksblad newspaper; site and posters notices were erected in the town of De Aar and e-mail notifications were sent to pre-identified I&APs (Appendix C).

Notification letters via email and registered mail will be sent to all I&APs informing them of the availability of the Draft BA Report for review and comment. The report will be made available for public viewing by appointment only at the Mulilo De Aar Site offices as Hard copy. Additionally, the report can be viewed digitally on the Arcus website (www.arcusconsulting.co.za/projects).

The draft BA Report will be subjected to a 30 day comment period from the 31 March 2021 to 3 May 2021 (both days inclusive). A Comments and Response Table will be compiled and will reflect the comments received before finalisation of this draft BA report, including any comments received during the initial 30 day comment period (Appendix C). The Comments and Response Table will be updated throughout the process as comments are received, and responded to and addressed by the project team, i.e. EAP, Applicant and Specialists as applicable and will be included in Appendix C of the final BA Report.

Registration of I&APs will continue throughout the process, and the I&AP database will be updated accordingly, based on comments received and included in the final BA Report.

5 BASELINE ENVIRONMENT

This section provides a brief description of the physical, biological, ecological, social, economic and cultural setting in which the proposed development is to be located. The information provided is based on actual studies conducted by specialist consultants and from existing literature and sources which was available for the study area and its surrounds. This baseline will provide the context in which the proposed development will be constructed.

5.1 Regional and Local Context

The Northern Cape is the largest province in South Africa, taking up nearly a third of the country's land area. From the 2011 South African Census[12], the geographical land area of Northern Cape was presented as 372 889 km² and population calculated a sum of 1 193 780 people. Although the largest province of South Africa, the Northern Cape is the least populous. The proposed development, in its broader context is located approximately 15 km east of the town of De Aar and falls within the Emthanjeni Local Municipality and Pixley ka Seme District Municipality of the Northern Cape Province. De Aar, approximately 84.23 km^2 is the largest town in the Emthanjeni Local Municipality and is the seat of the greater Pixley ka Seme District Municipality. This district is one of five districts in the Northern Cape Province of South Africa. De Aar has an estimated population of around 42,000 inhabitants and is said to be the second-most important railway junction in the country, situated between Cape Town and Kimberley. De Aar is also a primary commercial distribution center for a large area of the central Great Karoo. The majority of the population in this district, 77% of its 186,351 people speak Afrikaans as first language (2011 Census).

The Northern Cape is home to nearly 50% of the renewable energy developments in South Africa, especially around the town of De Aar. The proposed development requires authorisation to contribute to the increased social, economic and employment benefits to the local community and enable the Mulilo Total Hydra Storage to contribute to the positive increase in 'green energy' in this province (and town). The De Aar town is also located within the Renewable Energy Strategic Transmission Corridor, approved by Cabinet on the 17 February 2016, which has been identified as areas where long term electricity grid infrastructure be developed and where an integrated decision-making process for applications for environmental authorisation in terms of NEMA, 1998, will be followed.

The identification of the location of the proposed development was informed by the shortest and most feasible route between the authorised De Aar PV1 (DEFF Ref.: 12/12/20/2944) and the existing Eskom Hydra Substation and the importance of social and economic development in the town of De Aar. Further consideration was the location of similar infrastructure and available road network in the area, with the proposed routes primarily following existing infrastructure routes.

The most sensitive receptor may be the N10, which is a national route in South Africa connecting from the Northern Cape Namibian border at Nakop, via Cradock, De Aar and Upington to Port Elizabeth on the Eastern Cape coast. The closest view point to the N10 for the proposed development is at the existing Eskom Hydra Substation, which is located approximately 2 km from the road. There are a number of gravel roads traversing the proposed site, mainly used by the farmers in the area. Access to the proposed development is via a 6 km long gravel farm road off the N10.

[12] http://www.statssa.gov.za/census/census_2011/census_products/Census_2011_Census_in_brief.pdf

5.2 Climatic Conditions

Climate change is expected to affect the proposed development site over the lifetime of the proposed development; however, the nature, scale and severity of climate change effects are uncertain. Given this uncertainty, the existing environment is assumed to remain constant throughout the lifetime of the proposed development, and forms the current and future baseline for the impact assessments.

Rainfall in the De Aar area peaks in autumn (March) and the mean annual precipitation for De Aar is about 300 mm. Mean maximum and minimum monthly temperatures for De Aar are 37.1°C and -4.8°C for January and July, respectively. Rainfall for South Africa is given as 337 mm per annum (The World Bank Climate Change Knowledge Portal, undated).

5.3 Biophysical Characteristics

5.3.1 Soil, Agriculture and Land Capability

The proposed development is located on level Karoo plains, with low slope gradients, at an altitude of between 1,260 and 1,350 metres (Figure 5.1 reflects land use within the proposed development area). The dominant soils are shallow, calcareous, sandy loam soils on underlying rock, of the Mispah, Glenrosa and Swartland soil forms. The shallow soil depth, low rainfall and high evapotranspiration limits the agricultural and grazing potential of the site. The underlying geology is comprised of shales, mudstone and sandstone of the Beaufort Group and the Karoo Supergroup, and Dolerite intrusions are frequent.

In terms of land capability, this is defined as the combination of soil, climate and terrain suitability factors for supporting rain-fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non-arable grazing land, or at the lowest extreme, not even suitable for grazing. Values below 8 are generally not suitable for production of any cultivated crop.

Land capability of the proposed site is medium-low. Agricultural limitations include climatic moisture availability and shallow, stony soils. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only.

The proposed development site is currently used for low-intensity grazing and has little potential for other types of land use. The long-term grazing capacity of the site is fairly low at 20 hectares per large stock unit. The development is located within a sheep farming agricultural region and is currently used only for grazing. There is no cultivation across the project area. The only agricultural infrastructure is fencing of grazing camps, wind pumps and stock watering points. It was deemed possible that grazing can continue on the site during the construction and operation of the development.

5.3.2 Ecosystem and Biodiversity

5.3.2.1 Existing Biodiversity Areas

The Northern Cape Critical Biodiversity Area (CBA) Map was published in 2016[13] and it "updates, revises and replaces all older systematic biodiversity plans and associated products for the province". This includes the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008), from which the Northern Cape CBA Map derived identified CBA1 and CBA2 areas (and added additional CBA1 and CBA2 areas). The rationale for defining

[13] Oosthuysen, E. & Holness, S. 2016. Northern Cape Critical Biodiversity Areas (CBA) Map. Department of Environment and Nature Conservation & Nelson Mandela Metropolitan University.

the recent CBA areas is derived from the earlier (2008) conservation plan. Areas in the 2016 map include the following areas:

- Important Bird Areas (IBAs);
- Succulent Karoo Ecosystem Plan (SKEP) expert identified areas;
- Threatened species locations;
- Features from previous conservation plans (including CBA1 and CBA2 areas from the Namakwa District Biodiversity Sector Plan);
- Areas supporting climate change resilience, e.g. areas of high diversity, topographic diversity, strong biophysical gradients, climate refugia, including kloofs, south-facing slopes and river corridors;
- Conservation Plans from adjacent provinces; and
- Landscape structural elements, e.g. rocky outcrops, koppies, dolerite dykes, boulder fields, woody vegetation on outwash plains.

The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

- Protected Areas;
- Critical Biodiversity Area 1 (Irreplaceable Areas);
- Critical Biodiversity Area 2 (Important Areas);
- Ecological Support Areas; and
- Other Natural Areas.

The proposed grid connection corridor considered here does not include any CBA1 or CBA2 areas but is positioned wholly within an area classified as an ESA. This ESA is largely due to the presence of the Platberg-Karoo Conservancy IBA. The conservancy covers the entire districts of De Aar, Philipstown and Hanover in the south-eastern portion of the Northern Cape Province. Although the land in the IBA is primarily used for grazing and agriculture, it includes the suburban towns of De Aar, Philipstown, Petrusville and Hanover.

The position of the proposed development alongside multiple existing power lines converging on the Hydra MTS and the relatively small size of the development footprint makes it highly unlikely that the proposed development will have a significant negative impact on the functioning and goals of the ESA, IBA or the biodiversity in the area.

5.3.3 Habitats

There are four habitats identified by the specialist in close proximity to the proposed development. These include: Lowlands Plains Vegetation, Rocky Ridges and Outcrops, Washes and Drainage Lines. The area is dominated by dwarf karoo shrubs scattered grasses and occasional large shrubs typical of the Northern Upper Karo**o.** vegetation type. The vegetation exhibited signs of overgrazing to various degrees and is widespread and contiguous across the broader area.

Cliffs and rocky outcrops are associated with sediment layers more resistant to weathering these habitats and microhabitats are widespread in the area and only occur on a small section of the proposed development, therefore the localised impact associated with the footprint would be negligible. They are characterised by the presence of boulders and loose rocks with an open canopy of medium to tall woody shrubs above a sparse layer of grasses.

The proposed grid connection corridor traverses two lower lying areas which direct water towards drainage lines through which water is channelled during rainfall events. These areas are important for maintaining downstream habitats through the supply of water and sediment. Larger drainage lines downstream are often associated with deeper, looser soils which offer burrowing opportunities for various species and the larger downstream depressions collect sufficient water during the wet season to provide habitat, refuge, shelter and an increase in palatable vegetation for a variety of species that rely on such

features in an otherwise arid landscape. These habitats are susceptible to impacts associated with erosion and the invasion of alien plant species.

5.3.4 Plant Species

An area of roughly 50 km around the project site (centred on -30.662761; 24.165841) was searched for potential species of concern. Despite this broad search, there are very few species that were evaluated to be of conservation concern that could potentially occur in the project area. Only a single species, Transkei Medusa's Head *(Euphorbia flanaganii, Vulnerable)*, was evaluated to be of conservation concern on the BODATSA database search for the area, however it is the specialist's opinion that this record may have been a misidentification of the similar looking Karoo Spiny Milkweed *(E. arida, Least Concern)* given the distribution of the former species[14]. The potentially endemic *Chasmatophyllum maninum* was listed as Data Deficient. None of the plant species observed on site were listed in any threat category.

Fifty-one plant species that were listed on the BODATSA database for the study area and could potentially occur in the study site are protected under the Northern Cape Nature Conservation Act. None of the plant species listed on the BODATSA database for the study area or recorded on site were listed as protected by NEMBA. A number of species were found on site that are protected according to the Northern Cape Nature Conservation Act. From the field survey, the following species were observed on or around the project site (Plate 5-1): Steekvy *(Ruschia intricata)*, Eastern Candelabra *(Brunsvigia radulosa),* Krimpsiektebos *(Lessertia annularis),* Sorrel *(Oxalis depressa)* and Cape Saffron *(Jamesbrittenia aurantiaca).*

Plate 5-1: Several plant species observed on the project site are protected under the Northern Cape Nature Conservation Act such as Eastern Candelabra (left) and Steekvy (right).

Despite not being threatened, they are protected and any impacts on these species requires a permit from the relevant authorities. It must be noted that many of these species are widespread and not of any conservation concern, but protected due to the fact that the Northern Cape Nature Conservation Act protects entire families of flowering plants irrespective of whether some members are rare or common. The implication is that a comprehensive list of species occurring within the footprint of the proposed infrastructure is required and a permit application submitted for any of those listed as protected. A walk-through survey is therefore required once the final pylon positions and layouts have been decided in order to obtain the number of applicable plants for which permits are required for their destruction. This is a permitting requirement rather than a requirement needed to effectively assess the impacts.

[14] http://redlist.sanbi.org/species.php?species=574-126

5.3.4.1 Protected trees

One tree species, the Shepherd's Tree *(Boscia albitrunca)* is listed to occur in both habitat types present on the study site and is protected under the National Forest Act. However, this species was not recorded to be present on the study site during the ecological survey. No indigenous forests are present near the development corridor.

5.3.5 Animal Species

There were 61 mammal species listed in databases that could occur in the study area, 12 of which are listed as threatened or near threatened. Based on the habitats present in the grid connection corridor and surrounding areas, it is considered likely that some of these species could potentially occur on site. Given the habitats present the listed species with a geographical range that include the site (and therefore may be present) are Riverine Rabbit *(Bunolagus monticularis)* listed as Critically Endangered, Southern Mountain Reedbuck *(Redunca fulvorufula fulvorufula)* listed as Endangered, Black-footed Cat *(Felis nigripes)* and White-tailed Rat *(Mystromys albicaudatus)* listed as Vulnerable with Grey Rhebok *(Pelea capreolus)*, South African Hedgehog *(Atelerix frontalis)*, Spectacled Dormouse *(Graphiurus ocularis)* and African Striped Weasel *(Poecilogale albinucha)* listed as Near-threatened. The habitats and microhabitats present on the project site are largely widespread and active burrows were seen in close proximity to existing power line infrastructure, indicating that the presence of these structures did not deter burrowing animals from the site.

There are 13 amphibian species that have a geographical distribution that includes the project site. The Giant Bullfrog *(Pyxicephalus adspersus)* is listed by NEMBA as a *Protected Species*. This species was located in the broader area surrounding the project site and could potentially occur in the grid connection corridor near temporarily inundated depressions.

There are 23 reptile species recorded in databases or observed from in or around the area project site that could occur in the area. The Karoo Padloper *(Chersobius [Homopus] boulengeri*) is listed as Near Threatened in the Regional Red List, however a more recent assessment lists the species as Endangered as most localities where populations previously occurred no longer harbour viable populations and that the species is no longer being found by farmers. The Karoo Padloper is associated with dolerite ridges and rocky-outcrops in dwarf shrubland containing succulent and grassy elements. Such habitat is present on the project site and it could potentially occur in the area, albeit with a low probability.

There are 159 invertebrate species recorded from various databases that could occur on the project site. While this list cannot be considered to be complete, a single species with a distribution range that potentially overlaps the project site is listed by the IUCN as *Vulnerable*, namely the Harlequin Sprite *(Pseudagrion newtoni).* This damselfly is currently known from only a single location in Mpumalanga, the probability for this species to occur on site is low

5.4 Bat Characteristics

No confirmed bat roosts were identified within 500 m of the OHPL routes. The EAP does not foresee any bat-related issues with the proposed OHPL routes and associated infrastructure. Therefore, this impact was not assessed and is not discussed further in this report.

5.5 Avifaunal Characteristics

Avifaunal microhabitats occur at a smaller spatial scale than vegetation types and are shaped by factors including vegetation type, topography, land use, food sources and man-

made factors (e.g. the introduction of livestock and alien vegetation as well as the construction of infrastructure). Power lines in the district have been identified as a high threat to large terrestrial birds such as cranes and bustards, which collide with them, and to raptors, which have been electrocuted while perching on them. There are many existing power lines within the direct vicinity of the proposed development (Plate 5-2). Power lines can, however, also be beneficial to large raptors which breed on them in areas where large trees are uncommon.

Some areas around the project site are known to be important breeding and 'lekking' grounds for the Endangered Ludwig's Bustard *(Neotis ludwigii)*. 'Lekking' is a mating system where males congregate in an area to display to females, Ludwig's Bustards exhibit an 'exploded' or 'dispersed' lekking system in which the displaying males are more widely spread over an area than typical of more conventional lekking arenas observed in other species[15]. While the project site is not directly within these areas, the species could potentially be impacted upon while traversing the project site to and from these areas.

Plate 5-2: Multiple electricity transmission lines exist in the area, converging on the Hydra Main Transmission Substation.

South African Bird Atlas Project 2 (SABAP2) data was examined for the pentads (which are approximately 8 km x 8 km squares) in the study area. A total of 195 species were recorded by SABAP2 which includes 13 species classified as *Endangered, Near Threatened* or *Vulnerable* and 25 endemic or near-endemic species (Table 5.1). Due to the relatively few surveys conducted in some of the pentads (indicated by the number of cards submitted) several species which are likely to occur in the area have not been recorded by SABAP, Kori Bustard *(Near Threatened)* which was observed on site during the walk-through is notably absent from the data.

Table 5.1: Red-data and endemic or near-endemic species listed by SABAP2 and observed during the site walk-through

Species	Red Data	Endemic or Near-endemic	Observed
Bustard, Ludwig's	EN		*
Eagle, Martial	EN		
Eagle, Tawny	EN		
Pipit, African Rock	NT	*	*
Courser, Double-banded	NT		

[15] Allan DG: Ludwig's Bustard. In Roberts Birds of Southern Africa. 7th edition. Edited by: Hockey PAR, Dean WJR, Ryan PG. Trustees of the John Voelcker Bird Book Fund, Cape Town; 2005:293–294.

Species	Red Data	Endemic or Near-endemic	Observed
Crane, Blue	NT		
Flamingo, Greater	NT		
Korhaan, Karoo	NT		*
Courser, Burchell's	VU		
Eagle, Verreaux's'	VU		*
Falcon, Lanner	VU		*
Secretarybird	VU		
Stork, Black	VU		
Buzzard, Jackal		*	*
Canary, Black-headed		*	
Chat, Sickle-winged		*	
Eremomela, Karoo		*	*
Flycatcher, Fairy		*	*
Flycatcher, Fiscal		*	*
Francolin, Grey-winged		*	*
Korhaan, Blue		*	
Lark, Black-eared Sparrow-		*	*
Lark, Eastern Long-billed		*	*
Lark, Karoo		*	*
Lark, Large-billed		*	*
Lark, Melodious		*	
Prinia, Karoo		*	
Starling, Pied		*	*
Sunbird, Southern Double-collared		*	*
Swallow, South African Cliff		*	
Thrush, Karoo		*	
Tit, Grey		*	
Tit-Babbler, Layard's		*	*
Warbler, Cinnamon-breasted		*	
Warbler, Namaqua		*	
Weaver, Cape		*	*
White-eye, Cape		*	*

The entire project site falls within the large Platberg-Karoo Conservancy (ZA028). The conservancy covers the entire districts of De Aar, Philipstown and Hanover in the south-eastern portion of the Northern Cape Province. Although the land in the Important Bird Areas is primarily used for grazing and agriculture, it includes the suburban towns of De Aar, Philipstown, Petrusville and Hanover. This huge area lies in the plains of the central Great Karoo, forming part of the South African plateau and holds important populations of two globally threatened species (Blue Crane and Lesser Kestrel), several biome-restricted species and important populations of other arid-zone birds. Lesser Kestrel have roosts

throughout the area, including large roosts (5 000 – 10 000 individuals) in the towns of De Aar, Hanover and Philipstown; they are frequently seen foraging in the conservancy in summer, when close to 10% of the global population of Lesser Kestrels roost in this IBA. Some of the dams are important roosts; during summer 1996/97, more than 850 Blue Crane were counted on a dam in the IBA[16].

The lowland karroid plains are particularly preferable for species such as Ludwig's Bustard, Kori Bustard and large numbers of Karoo Korhaan, Karoo Lark, Karoo Chat, Tractrac Chat, Sickle-winged Chat, Lark-like Bunting and Karoo Long-billed Lark. In grassier areas Blue Korhaan may be commonly occurring. Black Harrier are occasionally seen quartering the plains, where huge numbers of Blue Crane regularly congregate. Tawny Eagle and Martian Eagle breed on the power lines in the area and it is common to see large nests on pylons or powerlines.

Collision (and electrocution) impacts with the existing power lines in the district have been identified as a high threat to large terrestrial birds such as cranes, bustards, and raptors. Power lines can, however, also be beneficial to large raptors such as Martial Eagle which prefer to breed on pylons in areas where large trees are uncommon.

Chris van Rooyen Consulting conducted an Avifaunal Impact Assessment Study in 2014 on the Longyuan Mulilo De Aar 2 North (Pty) Ltd 132kV overhead power line to connect the Longyuan Mulilo De Aar 2 North Wind Energy Facility (DEFF Ref. No. 12/12/20/2463/2) to the national transmission grid via Hydra Substation. This proposed power line routes assessed in this study runs adjacent to the power line assessed by van Rooyen (2014) for approximately 12 km. van Rooyen (2014) identified 11 Red Data species that could potentially occur in the area, and concluded that mitigation risks associated with collisions and habitat destruction would be low. A number of Verreaux's Eagle nests that occur in the study area were mapped by van Rooyen (2014) including a nest on a cliff within 500 m of the proposed power line route assessed in this study (Figure 11.1, 11.1c and 11.1d). WildSkies Ecological Services conducted an Avifaunal Impact Assessment Study on the Castle Wind Energy Facility directly adjacent to the land portions relevant to this study. Smallie (2014) scored the risk of the WEF for 15 target species (including Egyptian Goose) but also observed several notable species on site including Lanner Falcon, Amur Falcon, Secretarybird, Booted Eagle and Black-chested Snake Eagle. In discussing the mitigation of the grid interconnection, Smallie (2014) recommended that power line infrastructure be built to the east of the existing Eskom Hydra Roodekuil 220kV power line, and that the line will need to conform to all Eskom standards in terms of bird friendly pole monopole structures with Bird Perches on every pole-top (to mitigate for bird electrocution), and anti-bird collision line marking devices (to mitigate for bird collision) on the earth wires of high risk sections. Applicable mitigation measures included in these studies have been included in the avifauna assessment.

Powerline mortality data from around De Aar were obtained from the EWT to determine which species have suffered mortalities as a result of electrical distribution infrastructure in the area. The data received was collected between 2001 and 2018 and included collision mortality incidents of Ludwig's Bustard, Kori Bustard, Blue Crane, Verreaux's Eagle and an Unknown Flamingo. Electrocution mortalities included Verreaux's Eagle, Cape Eagle-owl, Lanner Falcon and Pale-chanting Goshawk.

Records of mortalities associated with the expansive stretches of OHPL from the Hydra substation between 2008 and 2016 revealed that the top ten affected species by Grid Interconnection in the larger area included Ludwig's Bustard, Blue Crane, Northern Black Korhaan, unidentified sp., White Stork, Pied Crow, Secretarybird, Kori Bustard, Karoo Korhaan and Blue Korhaan. No calculations regarding mortalities per km or per year were

[16] http://datazone.birdlife.org/site/factsheet/platberg-karoo-conservancy-iba-south-africa/text

performed as the data covers a number of years include power lines which cross areas that may pose a greater risk to birds and the numbers may therefore be misleading. These data were nevertheless useful to assist in the identification of species, including the Ludwig's Bustard, Kori Bustard, Karoo Korhaan, Northern Black Korhaan, Secretarybird and Verreaux's Eagle, shown to be at risk in the area.

Based on the baseline avifaunal data from the various data sources outlined above and evidence that large bodied birds such as cranes, flamingos, storks, korhaans and bustards (known to be particularly prone to collisions with power lines) have suffered collision mortalities in the area and that various raptor species have been electrocuted by transmission infrastructure the potential impacts of the proposed development on these types of birds was considered. The potential impacts to smaller passerine species is not likely to be significant as they are more susceptible to habitat loss and the total area of the development footprint is small relative to the available habitat in the area, these impacts are therefore not assessed further.

5.6 Rivers, Watercourses and National Freshwater Ecosystems Priority Areas

The proposed connection corridor only occurs within the D62D quaternary catchment of the Brak River, in the Nama Karoo Ecoregion. The survey area falls within an Upstream FEPA, associated with the Brak River, although no permanent fish habitat occurs within the proposed site, this catchment is important for the provision and maintenance of flows within the lower catchments that do contain important, fish, amphibian and invertebrate habitats with permanent water

Permanent rivers and wetlands are limited mostly to mainstem rivers such as those observed within the study area, typically only flow during extended periods of rainfall. No wetland areas were found along this portion of the proposed 6 km OHPL alignment.

5.7 Heritage and Cultural Landscape

The proposed grid connection line, switching station site and access road cross all of these landscapes, ranging from a series of valley bottoms divided by intrusive dolerite koppies in the south-east to a wide grassy plain in the north and west towards De Aar. The following heritage resources in the vicinity of the area covered by this project:

Palaeontological assessments by Almond (2012) and Bamford (2020) indicate that the grid connection, switching station and access road fall across a range of geological rock and sediment types, of which the Ecca and Beaufort shales are the most likely to preserve fossils. In both cases, however, vertebrate fossils were described as being rare in the area and none were reported by Almond (2012) from fieldwork on the farm Vetlaagte. Almond (2012) stresses, however, that cognisance should be taken of trace fossils, silicified woods and rare vertebrate remains of the Middle Permian Pristerognathus Assemblage Zone which are known from these shales elsewhere in the De Aar area.

In terms of Early, Middle and Late Stone Age, no Early Stone Age (ESA) sites or artefacts were identified in the 2020 ACO survey, or in the surveys by Kruger (2012), Orton (2012) and Orton and Webley (2013). Heavily patinated and weathered Middle Stone Age lithic material was widely reported by all the surveys, the artefacts including cores, flakes, blades and snapped blades. No other associated archaeological material (bone, ostrich eggshell, etc.) was found with the MSA lithics and discrete, clearly definable MSA sites were difficult to identify because material is generally visible only in areas where the overlying orange sand has been stripped away and because the landscape is liberally spread with material, a type of "ancient litter" (Webley and Orton 2011). Late Stone Age artefact assemblages were encountered mainly on ridges and along river drainages and contained artefacts made on hornfels, with occasional isolated pieces of other raw materials such as agate. As well as bone, ostrich eggshell and in a couple of instances, grass-tempered pottery (Gribble and

Euston-Brown 2020, Orton and Webley 2013). Smithfield industry artefact scatters, with no evidence of associated pottery and characterised by endscrapers (or duckbill scrapers) made on long flakes were noted in places as were sites containing early Holocene, Lockshoek lithics, dating to c.10 000 years ago. Both of these LSA lithic industries are typical of what is expected in this part of the Karoo according to Sampson (1985).

Circular packed stone features were noted by Gribble and Euston-Brown (2020) and Orton and Webley (2013) along the De Aar 2 South Grid Connection and on ridgelines on Badenhorst Dam respectively. Some of these features are almost certainly from the colonial era and are probably shepherds' huts but some are examples of pre-colonial Khoi kraals.

Orton and Webley (2013) reported a rock gong with an associated fine-line engraving that looks to be of an animal on Badenhorst Dam but the site is not close to the proposed grid connection, switching station and access road and will not be impacted by the proposals.

A small number of historical artefacts were noted by Gribble and Euston-Brown (2020) on and below the koppie on which the Khoi kraal complex was located, to the east of the proposed grid connection. This material suggests occupation may have dated to around the South African War and the proximity of the material to shepherds' huts at this site suggests they may be associated. The 2011 and 2013 surveys of Badenhorst Dam identified similarly thin and ephemeral scatters of historical material at a number of places on the farm, none of which, however, will be affected by the grid connection, the switching station or access road (Orton 2012, Orton and Webley 2013).

None of the field assessments referenced above encountered any graves or stone cairns in the vicinity of the grid connection route, switching station site or access road, although it must be borne in mind that pre-colonial graves are often completely unmarked and can be located anywhere where the soil is suitable for digging a grave. In addition, no historical buildings were recorded by the various surveys in the vicinity of the proposed grid connection, switching station or access road.

The landscape within which the grid connection, switching station and access road will be constructed is a cultural landscape of clear significance to a succession of pre-colonial and, to a lesser degree, colonial people, as demonstrated by the presence of the widespread archaeological sites and materials described above. This cultural landscape is essentially a series of layers of occupation and use by our ancestors that have become superimposed on the land surface. The land surface itself, while not cultural, is nevertheless of heritage value as a vast palaeontological repository. Early, Middle and Later Stone age people left at least half a million years of human debris on the land surface – stone tool scatters, engravings, kraals, etc. More recently the landscape received the imprint of the European colonisation of the region as it was used and settled by colonial Trekboers who imposed their structure on the land in the form of farm buildings, dams and fence alignments. Most recently there has been the introduction into landscape of modern industrial elements such as railways tracks and electrical infrastructure

5.8 Social Context

The proposed development is located within the Emthanjeni Local Municipality Non-Urban Area, and is situated approximately 15 - 25 km east of the town of De Aar. The demographic data pertaining to the local municipality from Census 2011, is indicated in Table 5.2 below.

Table 5.2 Demographic data of the Emathanjeni Local Municipality Non-Urban Area

Geographic area	13,471.96 km^2
Population	42,356 people

Population density	3.14 per km^2	
Households	10,457	
Household density	0.78 per km^2	
Gender	**People**	**Percentage**
Male	20,722	48.92%
Female	21,634	51.08%
Population	**People**	**Percentage**
Coloured	24,436	57.69%
Black African	14,059	33.19%
White	3,388	8.00%
Other	237	0.56%
Indian or Asian	236	0.56%

The dependency ratio is calculated by adding together the percentage of children (aged under 15 years) and the older population (aged 65+), dividing the percentage by the working-age population (aged 15 - 64 years) and multiplying that percentage by 100. For the Emthanjeni Local Municipality the dependency ratio in 2011 was 47.3, and was higher in 2001 at 60.1. Between 2001 and 2011 the population of the Pixley Ka Seme District Municipality increased from 186 351 to 195 595, of that, the Emthanjeni Local Municipality contributed an increase with 45 404 in 2011 compared to a total population of 42 356 in 2001.

The main economic sectors of the municipality are community services (36%), transport (24%), finance (13%), trade (11%), agriculture (7%), electricity (4%), manufacturing (3%), and construction (2%).

6 NEED AND DESIRABILITY

The authorised Mulilo Total Hydra Storage Project may be bid in the next bidding round (or in future bidding rounds) of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and/or the Risk Mitigation Independent Power Procurement Programme (RMIPPP).

Renewable energy is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. The National Climate Change Adaptation Strategy[17] (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this proposed development is the approach to "create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas". "This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions".

[17] https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf

Both national and provincial policies and planning documents support the development of renewable energy facilities, and the authorised Mulilo Total Hydra Storage Project cannot be developed without authorisation of a suitable grid interconnection. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan. At a provincial level, the development of renewable energy is supported by the Northern Cape Provincial Growth and Development Strategy and Northern Cape Provincial Spatial Development Framework. At a more localised level, in 2010 an investment and renewable energy conference declared the Pixley ka Seme District a 'Renewable Energy Hub'. The hub is aimed at providing cleaner energy and rural industrialisation in line with the IRP (2016) and IDP's of the municipality. Renewable energy generation is one of the key investment opportunities identified for the district. In addition to this, the Northern Cape Department of Transport, Safety and Liaison (NCDTSL) sought approval and funding for the De Aar Logistics Hub, which serves as a long-term strategy to optimise the freight and logistics functions of the province.

The need and desirability for these types of developments play a role in South Africa meeting its energy and climate change targets and also provides a socio-economic boost at the local level in areas that are in need of it.

The establishment of the OHPL and construction of the switching station in the area may place pressure on local services, specifically medical, education and accommodation, associated with the potential influx of people to the area in seek of employment opportunities. The potential impact or pressures on local services can be mitigated by employing local community members and should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of such infrastructure as an economic driver in the area.

A current requirement of the REIPPPP is that for the development of any Renewable Energy project and its associated infrastructure, the local economy must benefit through employment opportunities, skills development, and the development or enhancement of community infrastructure. The cumulative effect of the proposed development and other developments in the area has the potential to result in high significance positive socio-economic opportunities for the region.

The proposed project has the potential to create a number of socio-economic opportunities which will result in a positive social benefit. The positive cumulative impacts include creation of employment, training opportunities which enhances skills development, and the creation of downstream business opportunities.

South Africa faces serious electricity and water shortages due to its heavy dependency on fossil fuels and increases in demand. There is, therefore, a strong need for additional electricity generation options to be developed and to diversify the sources of energy that feed into the national grid.

The purpose of the proposed development is to export the renewable energy, generated by the authorised Mulilo Total Hydra Storage Project to the national grid. There are many other socio-economic benefits that could be realised should the project be authorised. These include (but are not limited to):

- Reduced air pollution emissions - burning fossil fuels generates CO_2 emissions which contribute to global warming. In addition, burning fossil fuels produces emissions of sulphurous and nitrous oxides which are hazardous to human health and impact on ecosystem stability;
- Water resource-saving - conventional coal-fired power stations use large quantities of water during their cooling processes. PV's require limited amounts of water during construction and almost no water during operation. As a water-stressed country, South Africa should be conserving such resources wherever possible;

- Improved energy security - renewables can often be deployed in a decentralised way close to consumers improving grid strength while reducing expensive transmission and distribution losses. They also contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources - biomass, solar and wind resources remain largely unexploited;
- Sustainable energy solution - the uptake of renewable energy technology addresses the country's energy needs in a sustainable manner, generating electricity to meet growing demands in a manner which is sustainable for future generations; and
- Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

In terms of the sensitivity of the proposed site to the proposed development, the site is currently used for low-intensity grazing which could continue on the site during the construction of the development. The fauna and flora found on the site will not be at significant risk from the development on either vegetation types. Neither vegetation type, both listed as *Least Threatened,* is listed in the National List of Ecosystems that are Threatened and in Need of Protection (GN 1002,2012) published under the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA).

Multiple existing power lines already cross this area and as medium to long term lease agreements are in place between land owners and developers, it is unlikely that this area will be incorporated into National Protected Areas in the foreseeable future. The low overall footprint of the development within the ESA, combined with the fact that the proposed route runs adjacent to existing power lines for most of the route, the proposed development would not compromise the ecological functioning or the long-term conservation value of the area.

7 ASSESSMENT OF ALTERNATIVES

7.1 Legislative Requirements

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), a BA report must contain a consideration of all alternatives, which can include activity alternatives, site alternatives, location alternatives and the "No Development" alternative. At a minimum, this chapter must address:

- The consideration of the No Development alternative as a baseline scenario;
- A comparison of reasonable and feasible selected alternatives; and
- The provision of reasons for the elimination of an alternative.

Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors. For applications submitted to the DEFF for environmental authorisation in terms of the NEMA, (Act 107 of 1998) and National Environmental Management: Waste Act (NEM:WA, No. 59 of 2008), in respect of listed activities that have been triggered, this project is expected to assess alternative route options, locations, the design and layout of the development, technologies, operational aspects and the "do-nothing" / "no-go" alternative.

When assessing alternatives, they should be "practical", "feasible", "relevant", "reasonable" and "viable", and that I&APs should be provided with an opportunity to provide inputs into the process of formulating alternatives. In this instance, this chapter provides an overview of the alternatives that have been considered for this development.

7.2 Route Alternatives

There is only one proposed route assessed in this report for the proposed development.

The overhead powerline (OHPL) will evacuate electricity generated from the Mulilo Total Hydra Storage Project and is to be approximately 8 km in length, with a capacity of up to 132 kV. The proposed OHPL follows the existing 132 kV Eskom Hydra-Bushbuck OHPL for the most part, and will run in a south easterly direction to the Eskom Hydra Main Transmission Substation (MTS). A single track service road will be required for the construction and maintenance of the OHPL and would run directly below the OPHL. The intended end-user for this project is Eskom, and responsibility will be handed over to Eskom should favourable environmental authorisation be granted and the project successfully commissioned.

The specific characteristics of the study area described below, confirms feasibility and motivates that either Alternative is acceptable:

Land Availability and Land Use: In order to develop the OHPL and associated infrastructure, sufficient land is required. Land capability evaluation values range from medium to low across the project area. Agricultural limitations include climatic moisture availability and shallow, stony soils. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only. The proposed development will not affect potential of agriculture in the area; thus, land use is available.

Geographical considerations: The proposed route traverse a series of flat valley bottoms divided by intrusive dolerite koppies. These are considered good conditions for the construction of OHPL – hence the many lines within the vicinity of De Aar town.

Sensitive environmental features considerations: Specialist assessed a corridor which was 200 m[18] (i.e. 100 m on either side of the proposed Grid connection). The assessment of specialists and review of public data of the study area assisted in buffering and avoiding any potential sensitive areas. The EMPr includes mitigation measures, if any specific, for the development.

7.3 Location and Layout Alternatives

The location and layout of the proposed development is considered the most feasible as it is the most direct and follows an existing reserve for the most part. The OPHL is the shortest route from the Mulilo Total Hydra Storage Project (requiring connection to the grid) and the Eskom Hydra substation. Furthermore, the switching station will be located adjacent to the Mulilo Total Hydra Storage Project IPP collector substation.

MTHS are proposing to perform a "loop in loop out" onto one circuit of the existing Eskom Hydra-Bushbuck double circuit 132kV OHPL and to restring the remaining portion of that circuit (if required) between the Project and the Hydra Substation. The purpose of the proposed restring is provide additional electricity evacuation option to Eskom and to the Mulilo Total Hydra Storage Project and to minimise any potential servitude or feeder bay constraints at the Hydra Substation. This proposed commission will not trigger any additional activities other than those being applied for.

The proposed development is located in an area which has previously been transformed for electrification and infrastructural projects of a similar nature. The placement of similar infrastructure parallel to the existing infrastructure provides an opportunity to consolidate these and creates a cluster of the same infrastructure within an area rather than having it dispersed randomly in the surrounds. This reduces the significance ratings, with mitigation, of the negative impacts to the baseline environment.

[18] The aquatic specialist assessed a corridor of 500 m (i.e. 250 m on either side of the proposed transmission lines).

The proposed access road is the most direct route to the switching station and as far as possible the route follows existing farm roads. This layout proves to be the most effective with the least negative impacts.

7.4 Grid Interconnection Technology Alternatives

The main purpose of the proposed development is to connect the authorised Mulilo Total Hydra Storage Project (in particular the De Aar PV1) to the national grid. Note that technologies change on a regular basis and the most reliable, safest and cost-effective technology that is available and that meets industry and Eskom standards will be used. Alternatives are proposed for the type of structures which will support the overhead lines. These may include:

- Concrete or steel monopoles (preferred);
- Guy line supported steel structures (small footprint);
- Freestanding metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

Refer to **Plates 7-1 to 7-4** for typical examples of these tower types. All aspects of the grid interconnection, including powerline and supporting structures, would need to adhere to industry and Eskom standards.

Plate 7-1: Concrete or steel monopoles.

Plate 7-2: Guy line supported steel structures.

Plate 7-3: Freestanding metal lattice towers.

Plate 7-4: Multi-pole structures such as H-towers or K-towers.

Table 7.1: Advantages and Disadvantages of the Grid Interconnection Alternatives

No.	Alternatives	Advantages / Disadvantages

1	Concrete, steel monopoles structures (preferred)	• These are the Eskom standard towers • Cost-effective • Steel monopole is the preferred structure from an avifaunal perspective, and acceptable from a visual perspective
2	Guy line supported steel structures	• Small footprint • Not considered preferable for the proposed application due to theft of members and agricultural aversion due to stay wires
3	Free standing steel lattice towers	• Not preferred from an avifaunal perspective • Not considered preferable for the proposed application due to possible theft of members and cost
4	Multi-pole structures such as H-towers or K-towers	• Not preferred from an avifaunal perspective • Wooden structures are fire hazard and degrade faster • Not considered reasonable or feasible for the proposed application

7.5 The No Development Alternative

The 'No Development' scenario assumes that the proposed development does not proceed, implying a continuation of the *status quo*. It is equivalent to the future baseline scenario in the absence of the proposed development.

Relative to this authorisation, the main implication of the 'No Development' scenario is that the proposed development will not be constructed and the authorised Mulilo Total Hydra Storage Project will not have a route to transfer the electricity generated to the existing Eskom Hydra Substation and into the national grid. Evacuation of the electricity generated by the Mulilo Total Hydra Storage Project (in particular the De Aar PV1) is necessary for the project to proceed. The result will also include the following:

- There is no change in the current landscape or environmental baseline;
- The authorised Mulilo Total Hydra Storage Project (in particular the De Aar PV1) will not be constructed without the required grid infrastructure and switching station to transfer the electricity generated to the national grid;
- The Mulilo Total Hydra Storage Project (in particular the De Aar PV1) will not succeed in the REIPPP and RMPPP, and the potential social economic, and climate change mitigation benefits would not be realised by the PV and Grid Interconnection;
- There is less opportunity for additional employment (albeit temporary) in the local area where job creation is identified as a key priority;
- The local Economic Development benefits associated with the development of the Mulilo Total Hydra Storage Project and its associated infrastructure's REIPPPP and RMPPP commitments will not be realised, such as securing local energy production;
- The potential to mitigate climate change impacts on the environment and local species will be limited; and
- The establishment of renewable energy targets on a provincial and national scale will not be realised from this proposed development.

Furthermore, the no-go alternative, as assessed by the avifaunal specialist, is not necessarily the most ecologically attractive alternative with respect to avifauna in the area, as opportunities exist to improve the visibility of existing infrastructure to birds with the proposed development. The no-go alternative is therefore not the preferred alternative from an avifaunal perspective.

7.6 Summary of Alternatives Considered

The 'no-go' alternative is not considered acceptable. The proposed route is the shortest, most direct and technically feasible route to connect the authorised Mulilo Total Hydra Storage Project to the existing Eskom Hydra substation. In this landscape, described above, one way of minimising impacts to the environment is to reduce the development footprint and size of the development. This has been done by putting forward the shortest feasible route/s for assessment. Furthermore, the switching station will be in an area within the authorised Mulilo Total Hydra Storage Project site transmission corridor, alongside the authorised central collector substation.

8 DESCRIPTION OF THE PREFERRED ALTERNATIVE

8.1 MTHS Self Build Grid Interconnection (Overhead power line):

The overhead powerline (OHPL) will evacuate electricity generated from the Mulilo Total Hydra Storage Project and is to be approximately 8 km in length, with a capacity of up to 132 kV. The proposed OHPL follows the existing 132 kV Eskom Hydra-Bushbuck OHPL for the most part, and will run in a south easterly direction to the Eskom Hydra Main Transmission Substation (MTS). A single track service road will be required for the construction and maintenance of the OHPL and would run directly below the OPHL. The intended end-user for this project is Eskom, and responsibility will be handed over to Eskom should favourable environmental authorisation be granted and the project successfully commissioned.

The grid connection route considered in this application was previously assessed as a 200m wide corridor (100m on either side of the line) for the 400 kV grid connection associated with the Mulilo De Aar 2 South Wind Energy Facility ('DA2S WEF') (Arcus, 2021). The specialist assessments conducted for this route have been used to inform the baseline environment and impacts for this proposed development

- Design and construct ±8 km of single circuit 132 kV overhead power line (OHPL), between the Hydra MTS and Mulilo Total Hydra Storage Project;
- The overhead power line is to be strung with twin tern conductor;
- Preferred technology to be that of bird friendly steel monopole structures. These are to be used with a maximum height of 25m.
- Telecommunication via fibre optic is required on the 8km HV Line.

Associated infrastructure will include:

- Foundations and insulators;
- Existing access roads and jeep tracks; and
- Line and servitude clearances to meet the statutory requirements.

8.2 MTHS Self-Build Associated Infrastructure:

This associated infrastructure is being mentioned as part of this report as they form part of the Grid Interconnection Project to be handed over to Eskom for commissioning responsibility.

8.2.1 Switching Station Access Road:

A 6km long, 12 m wide access road is required for construction and maintenance of the self-build switching station. Access begins off the N10 highway and terminates at the self-build switching station. A <6m service road continues along the proposed OHPL route within the servitude, and as far as possible, this road will be used.

8.2.2 Self-Build Switching Station:

A 132 kV, double busbar switching station, is required to be constructed at the Mulilo Total Hydra Storage Project site. The switching station is named the Self Build Switching Station, and will house the required metering and protection equipment inside various substation buildings. In addition, there will be spatial provision to establish at least four additional outgoing feeder bays with access to the property for at least two additional incoming line bays to cater for future expansions. The switching station will eventually contain six bays but would start with the initial two bays as required by the Mulilo Total Hydra Storage project. The land required would be 100 m x 100 m for the 2-bay phase, increasing to 200 m x 100 m for six bays and with a maximum height of 25 m.

8.3 Additional Project Considerations:

The following two project considerations have been proposed by MTHS as part of the self-build agreement with Eskom. These will be commissioned in terms of Eskom's Build guidelines and preference.

8.3.1 Upgrades at Hydra MTS:

As part of the above-mentioned self-build, MTHS intend on extending the existing 132kV double busbars by one bay and establishing a new 132kV feeder bay at the Eskom Hydra MTS. This upgrade will also include protection and metering component

9 ASSESSMENT OF POTENTIAL IMPACTS

The focus and defining question of each potential impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or future production of the baseline environment. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or future production of the baseline environment.

This chapter describes the potential impacts assessed during each phase, and the cumulative assessment is reflected in Chapter 10. A summary table of the potential impacts is included in the Executive Summary.

9.1 Soil

For agricultural impacts, the exact nature of the different infrastructure technologies within the facility has very little bearing on the significance of impacts. What is of most relevance is simply the occupation of the land, and whether it is being occupied by a pylon foundation or a switching station makes no difference. What is of most relevance therefore is simply the total footprint of the facility. The proposed development has negligible impact on agriculture in this environment for two reasons:

- Overhead transmission lines have no agricultural impact because all agricultural activities that are viable in this environment (grazing) can continue completely unhindered underneath transmission lines.
- The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture, is restricted to pylon bases and a small substation that, in the context of the agricultural environment of low density grazing on farms which are typically thousands of hectares large, is entirely insignificant.

The only possible source of impact is minimal disturbance to the land during construction and decommissioning. The single agricultural impact is therefore minimal soil and land degradation (erosion and topsoil loss) as a result of land disturbance. Lastly, there are no additional mitigation measures required, over and above what has already been included in the Generic EMPr for overhead electricity transmission and distribution infrastructure as

per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019. Therefore this aspect has not been assessed with the ratings methodology.

9.2 Aquatic

The following direct impacts were assessed with regard to the riparian areas and watercourses based on the proposed OHPL:

- Impact 1: Loss of riparian systems and the disturbance of the alluvial watercourses in the construction and decommissioning phases where the impact will remain low, mostly due to avoidance of these areas
- Impact 2: Impact on aquatic systems through the possible increase in surface water runoff on riparian/wetland form and function during the operational phase was rate low, due to avoidance and or mitigation
- Impact 3: Increase in sedimentation and erosion in the construction, operational and decommissioning phases would remain low, firstly due to the type of development, the receiving environment and management of any stormwater flows should they occur
- Impact 4: Potential impact on localised surface water quality during the construction and decommissioning phases would also remain low,

The following impacts were not assessed as these were found not applicable:

- Loss of species of special concern – no listed or protected aquatic species were found during the assessment
- Loss of any wetlands – the only natural wetland observed could be avoided by the strategic placement of towers

The potential impact on aquatic species of special concern was not assessed, as no listed or protected species were observed during the assessment. Similarly, the loss of any natural wetlands did not require assessment as the only system observed could be spanned easily.

9.2.1 Construction, Operation and Decommissioning Phases

Impact Phase: All Phases							
Potential impact description: Loss of riparian system, wetlands and disturbance of the alluvial watercourses Should any of the proposed structures associated with the OHPL be placed within the delineated watercourse, a physical loss of associated vegetation as well damage to the bed and banks of the observed systems could occur. Although true aquatic obligate vegetation was seldom seen, any disturbance of these areas could result in disturbance of the systems resulting in erosion / sedimentation, loss of habitat and corridor (Ecological Support Area) fragmentation. These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in loss and/or damaged vegetation, while to a lesser degree in the operation phase (i.e. as and when maintenance occurs).							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	**L**	L	H
Can the impact be reversed?			Yes – through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation				
Will impact cause irreplaceable loss or resources?			No – significant water courses remain within the greater catchment				
Can impact be avoided, managed or mitigated?			Yes – refer to mitigations below				

Mitigation measures to reduce residual risk or enhance opportunities:

- A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with micro-siting of the final tower layout as required.
- Due to the broad nature of the alluvial systems, towers would need to the placed in some of these areas, but it is recommended that no new permanent tracks to access these areas are created.
- Vegetation clearing, where required, should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off.
- Any topsoil removed during excavation activities must be kept aside and used for the rehabilitation of temporarily disturbed areas
- Construction activities in or near drainage lines, washes or temporary inundated depressions must only take place during the dry season
- General maintenance should be conducted during the dry season where possible
- Utilize existing servitudes and access roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required
- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed;
- Ensure that sufficient erosion control measures are constructed and/or rehabilitated on all servitudes and access roads on and to the project site;
- All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate energy in the water stream which may pose an erosion risk;
- Regular monitoring for erosion is to take place regularly throughout the lifespan of the project (e.g. during routine maintenance) and reported for prompt intervention with appropriate erosion control solutions;
- An environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. Including topics such as avoiding fire hazards, no littering, appropriate handling of pollution and chemical spills, minimizing wildlife interactions, remaining within demarcated construction areas, avoidance of sensitive habitats (i.e. wetlands)
- It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas within aquatic environment, using selected species detailed in this report.
- All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Prosopis (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr.

Impact Phase: All Phases

Potential impact description: Increase in sedimentation and erosion within the development footprint

Impacts include changes to the hydrological regime such as alteration of surface run-off patterns, runoff velocities and or volumes which could occur during the construction, operational and decommissioning phases.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	**L**	L	H

Can the impact be reversed?	Yes – through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation
Will impact cause irreplaceable loss or resources?	No – significant water courses remain within the greater catchment
Can impact be avoided, managed or mitigated?	Yes – refer to mitigations below

Mitigation measures to reduce residual risk or enhance opportunities:

- Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities.

Impact Phase: All Phases							
Potential impact description: Impact on localised surface water quality During construction / decommissioning and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction or maintenance activities could be washed downslope and into potential drainages.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	L	H
With Mitigation	L	L	L	Negative	**L**	L	H
Can the impact be reversed?	Yes = through typical measures associated with the cleanup of spills						
Will impact cause irreplaceable loss or resources?	No – due to limited flows within these systems						
Can impact be avoided, managed or mitigated?	Yes – see mitigations below						
Mitigation measures to reduce residual risk or enhance opportunities: • Strict use and management of all hazardous materials used on site in line with the specific material safety data sheets, e.g. fuels must be stored within a contained / bunded site with the necessary and spill kits available. • Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.). • Containment of all contaminated water by means of careful run-off management on the development site. • Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. • Strict control over the behaviour of construction workers, with regard littering, use and storage of chemicals. • Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Programme (EMPr) for the project and strictly enforced.							

9.2.2 Operation and Decommissioning Phases

Impact Phase: Operation and Decommissioning							
Potential impact description: Impact on aquatic systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	**L**	L	H
Can the impact be reversed?	Yes – through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation						
Will impact cause irreplaceable loss or resources?	No – significant water courses remain within the greater catchment						
Can impact be avoided, managed or mitigated?	Yes – refer to mitigations below						
Mitigation measures to reduce residual risk or enhance opportunities: • Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities. • No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation.							

- Stormwater in the switching station must be managed using appropriate channels and swales to contain dirty water runoff.

9.3 Terrestrial Ecology

Potential impacts on the terrestrial ecology of the study area include the following:

9.3.1 Impact 1: Habitat Destruction during Construction

Small sections of natural habitat will be destroyed during the construction phase for the upgrading of servitudes and access roads and for clearing of pylon bases, switching station, lay-down areas and temporary construction facilities.

The vegetation type associated with the development corridor is largely intact and contiguous in the broader area the impact is considered to be of low significance. Pylon bases have a relatively small footprint and therefore do not pose a significant impact of habitat loss. The use of existing access roads and servitudes associated with the adjacent, existing power line will significantly reduce the impact associated with the proposed development, as the total area of natural habitat that needs to be cleared will be relatively small. Most of the novel clearing will therefore be transient in nature and for a short duration, as recovery will take place once the construction phase is completed. The potential risks to habitats also includes pollution and contamination, particularly wetland and aquatic environments, from construction activities (e.g. oil leaks or chemical spills).

While the clearing of some habitat during construction is inevitable, the probability that the clearing associated with the proposed development will have a negative impact on the faunal populations in terms of their long-term viability and persistence in the area is low, and therefore the impact significance is low. These impacts can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction

Potential impact description: Habitat loss associated with the clearing of vegetation for pylon bases, switching station, lay-down areas and temporary construction facilities. This impact also includes the Loss and/or fragmentation of indigenous natural vegetation due to clearing; Loss of faunal habitat and refugia and Loss of individuals of protected plant species

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	L	L	H
With Mitigation	L	M	L	Negative	**L**	L	H

Can the impact be reversed?	Mostly. Destruction of habitat will largely be transient in nature.
Will impact cause irreplaceable loss of resources?	No. The habitats on site are widespread and the footprint of the power line pylons is relatively small.
Can impact be avoided, managed or mitigated?	Mostly. The use of existing servitudes will mitigate most of the residual impact.

Mitigation measures to reduce residual risk or enhance opportunities:

- Preconstruction walk-though of the development footprint (pylon bases, new servitudes, lay-down areas and temporary infrastructure) must be conducted for micrositing to ensure that sensitive features such as burrow systems are avoided where possible;
- No construction of pylon towers in high sensitivity areas;
- Ensure that lay-down and other temporary infrastructure are within low sensitivity areas;
- Existing roads and servitudes to be used wherever possible;
- Minimise the development footprint as far as possible and rehabilitate disturbed areas that are not required by the operational phase of the development such as lay-down areas and temporary construction facilities (i.e. a Habitat Rehabilitation Programme is required);

• No construction activity must occur within seasonally inundated areas during the peak rainfall period in summer to reduce the potential impact on wetland habitats; • All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • Ensure that sufficient erosion control measures are constructed on all servitudes and access roads in the project area; • Rehabilitate existing servitude and access roads in the project area with sufficient erosion control measures to prevent the loss of soil and the degradation of habitats; • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. 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; and • No open fires should be permitted outside of designated areas.	
Impact to be addressed/ further investigated	Yes. Micrositing of infrastructure is required after finalization of locations and prior to construction to ensure that no active burrow systems are destroyed.

9.3.2 Impact 2: Disturbance and Displacement of Fauna during Construction

Disturbances and noise from staff and construction activities can impact certain sensitive species, resulting in effective habitat loss through a perceived increase in predation risk. There are various sensitive species that could potentially occur on the project site including Ludwig's Bustard, Kori Bustard, Northern Black Korhaan, Karoo Korhaan and Blue Crane. Disturbance can cause these species to be displaced, either temporarily (i.e. for some period during the construction activity) or permanently (i.e. they do not return), into less suitable habitat which may reduce their ability to survive and reproduce. However, as the area surrounding the project site is largely untransformed, contiguous, suitable natural habitat, displacement distances should not incur a great energetic cost and should allow for rapid return to the site once the disturbance concludes. The probability that disturbance or displacement of terrestrial animal species associated with the construction of the proposed development will have a negative impact on the faunal populations in terms of their long-term persistence and viability in the area is low, and therefore the impact significance is low. These impacts can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction							
Potential impact description: Displacement of priority species, particularly Red Data species, due to disturbance associated with construction activities. This also includes the direct mortality of fauna due to machinery, construction and increased traffic; Displacement and/or disturbance of fauna due to increased activity and noise levels and Increased poaching and/or illegal collecting due to increased access to the area							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	M	Negative	L	L	H
With Mitigation	L	L	L	Negative	**L**	L	H
Can the impact be reversed?	Yes. Disturbance associated with construction is transient in nature and the impact will cease once construction has been completed.						
Will impact cause irreplaceable loss of resources?	No. Faunal communities will recolonize the area once construction has been completed.						
Can impact be avoided, managed or mitigated?	Yes. The probability and intensity of disturbance can be reduced with mitigation measures.						
Mitigation measures to reduce residual risk or enhance opportunities: • Maximize the use of existing access road and servitudes; • No off-road driving should be permitted; • Speed limits (30 km/h) should be strictly enforced for heavy vehicles on the project site to reduce unnecessary noise;							

• Construction camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate to reduce disturbance of nocturnal fauna; • The movement of construction personnel should be restricted to the construction areas on the project site; • No dogs or cats other than those of the landowners should be allowed on site; • An appointed Environmental Control Officer (ECO) must be trained by an avifaunal specialist to identify ground nesting species such as bustards as well as the signs that indicate possible breeding by these species; • The ECO must make a concerted effort to look out for such breeding activities especially of Red Data species (e.g. Ludwig's Bustard); • If any Red Data species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.	
Impact to be addressed/ further investigated	Yes. Observations by the ECO for breeding activity to continue throughout the construction period.

9.3.3 Impact 3: Direct Impact to Fauna during Construction

Sensitive and shy fauna are likely to move away from the affected areas during construction, while some slow-moving species would not be able to avoid the construction activities and might be killed. Increased traffic during construction will pose a risk of collisions with susceptible fauna. Tortoises, snakes and amphibians are particularly susceptible to collisions, however many other species are also at risk such as Aardwolf, Bat-eared Foxes, rabbits/hares, Steenbok *(Raphicerus campestris)* and Cape Porcupine *(Hystrix africaeaustralis)*, particularly at night. Black-footed Cats, African Striped Weasel, Riverine Rabbits and South African Hedgehog may also potentially be at risk to nocturnal vehicle collisions. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. Many of these impacts can however be effectively managed or mitigated against. Giant Bullfrog bury themselves deeply during the dry season, it is unlikely that construction activities will have a negative impact on this species if mitigation measures are adhered to.

The probability of direct faunal mortalities associated with construction activities having a negative impact on the viability of terrestrial animal populations persisting in the area over the long term is low given the small scale of the development footprint relative to the largely undisturbed habitat available in the surrounding area, therefore this impact is considered to be of low significance. The impact can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction							
Potential impact description: Direct impact to fauna caused by construction activities, such as increased risk of injury or mortality from collision with vehicles due to increased traffic, the increased possibility of illegal hunting, poaching, persecution or harvesting of fauna.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	M	Negative	L	L	H
With Mitigation	L	L	L	Negative	**L**	L	H
Can the impact be reversed?			No.				
Will impact cause irreplaceable loss or resources?			Potentially. If rare or threatened species suffer direct mortality.				
Can impact be avoided, managed or mitigated?			Yes. The probability and intensity of this impact can be reduced through mitigation.				
Mitigation measures to reduce residual risk or enhance opportunities: • Construction of infrastructure in or near aquatic environments must be conducted during the dry season;							

• All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • All construction vehicles should adhere to a low speed limit (30km/h) on the project site to avoid collisions with susceptible species; • Night driving must be avoided where possible; • Any holes dug e.g. for foundations of pylons should not be left open for extended periods of time to prevent entrapment of ground dwelling fauna and only be dug when required and filled in soon thereafter; • Site access should be controlled and no unauthorised persons should be allowed onto the site; • Personnel should not be allowed to wander off the construction site; • All personnel should undergo an initial environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes or tortoises; • The illegal collection, hunting or harvesting of animals at the site should be strictly forbidden; • No animals such as dogs or cats to be allowed on site other than those of the landowners; • No open fires should be permitted outside of designated areas; • Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. • Any trenches or pits opened during construction must not be left open for extended periods of time to prevent entrapment of species (such as tortoises), any open trenches or pits must be regularly checked for entrapped species; • Any fauna directly threatened by the construction activities should be removed to a safe location by the environmental control officer or other suitably qualified person; • Construction camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate to reduce the disturbance and foraging activities of nocturnal species; • Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread (i.e. an Alien Species Control Programme is required); • Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible ; and • The use of herbicides (if absolutely required) for the control and eradication of alien grasses should be done in accordance with an alien eradication programme to reduce unintended ecological impacts	
Impact to be addressed/ further investigated	No.

9.4 Operational Phase Impacts

9.4.1 Impact 4: Reduction in Faunal Habitat Quality during Operation

The clearing and disturbance of areas during the construction phase of the project can result in an increased and ongoing risk of invasion of alien plant species, particularly pioneer species, along the power line route and underneath pylon towers during the operational phase. Disturbance created during construction could also leave the disturbed areas vulnerable to soil erosion and the presence of upgraded roads may increase water flow off hard surfaces which can contribute to erosion. The establishment of alien vegetation and increased soil erosion has the potential to degrade habitat quality if left unchecked. Due to the episodic high rainfall events during the wet season the probability of erosion is high. However given the relatively small scale of the development footprint the probability that erosion will lead to a measurable deterioration in habitat quality is medium, resulting in an impact significance of medium. Alien plant control and erosion can be effectively mitigated against and therefore the impact significance of the proposed development on terrestrial animal habitat quality is of low significance following mitigation.

Impact Phase: Operational							
Potential impact description: Following construction, the site will be vulnerable to alien plant invasion and soil erosion.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	M	M	H

With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?			No. Once erosion takes place some irreversible damage occurs.				
Will impact cause irreplaceable loss or resources?			Yes. Without mitigation the loss of topsoil would result in an irreversible loss of resources.				
Can impact be avoided, managed or mitigated?			Yes. Erosion and Alien plant control measures can be very effective.				
Mitigation measures to reduce residual risk or enhance opportunities: • Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan included in the EMPr; • All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate energy in the water stream which may pose an erosion risk; • Existing servitudes and access roads along the existing, adjacent power line must be utilised wherever possible; • Existing servitudes and access roads along the existing, adjacent power line must be upgraded with appropriate and effective erosion control measures; • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance; • Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread; • Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible; and • The use of herbicides (if absolutely required) for the control and eradication of alien grasses should be done in accordance with the alien eradication programme in the EMPr to reduce unintended ecological impacts.							
Impact to be addressed/ further investigated			Yes. Existing servitude and access roads to be surveyed with problem areas identified for erosion restoration and additional erosion control.				

9.4.2 Impact 5: Disturbance and Displacement of Fauna during Operation

Periodic maintenance is required of the servitude and grid connection infrastructure, including the regular clearing of excess vegetation to allow for unrestricted movement along the service and access roads and to minimize the risk of fires. The power line may also require aerial inspection or maintenance. The disturbance of fauna during the operational phase, while ongoing, is not continuous and as the position of the proposed development footprint is adjacent to existing transmission infrastructure the individuals of species that persist in this area are likely to already experience levels of disturbance associated with these activities. The probability that the disturbance or displacement of individuals of species during the operation phase, particularly those species of conservation concern, will negatively impact the viability and persistence of the species in the area for the long term is low, therefore the significance of the impact is considered to be low. These impacts can be further reduced following mitigation measures.

Impact Phase: Operation							
Potential impact description: Displacement of species, particularly Red Data species, due to disturbance associated with operational activities such as power line assessment and maintenance.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	L	L	High
With Mitigation	L	M	L	Negative	**L**	L	High
Can the impact be reversed?			Yes. Fauna will move back into the area after a disturbance event.				

Will impact cause irreplaceable loss of resources?	No.
Can impact be avoided, managed or mitigated?	Yes. The probability and intensity of disturbance can be reduced with mitigation measures.
Mitigation measures to reduce residual risk or enhance opportunities: • All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • Speed limits (30 km/h) should be strictly enforced to reduce unnecessary noise; • The movement of personnel should be restricted to the servitudes and access roads on the project site; and • No dogs or cats other than those of the landowners should be allowed on site to reduce disturbance of fauna.	
Impact to be addressed/ further investigated	No.

9.4.3 Impact 6: Direct Impact to Fauna during Operation

Collisions with large (>132 kV) power lines are a well-documented threat to avifauna in southern Africa[19] while smaller lines pose a higher threat of electrocution but can still be responsible for collision. Collisions with overhead power lines occur when a flying bird does not see the cables, or is unable to take effective evasive action, and is killed by the impact or impact with the ground. Heavy-bodied birds such as bustards, cranes and waterbirds, with limited manoeuvrability are especially susceptible to this impact. Species that may be particularly affected on the proposed development site include Ludwig's Bustard, Kori Bustard, Karoo Korhaan, Northern Black Korhaan and Secretarybird. Ludwig's Bustard and Kori bustard are known to be particularly prone to collision[20].

Overhead power line infrastructure with a capacity of 132 kV or more do not generally pose a risk of electrocution due to the large size of the clearances between the electrical infrastructure components. Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. Electrocutions within the proposed switching station are possible but should not affect the more sensitive Red Data species, as these species are unlikely to use the infrastructure within the switching station yard for perching, nesting or roosting.

Direct mortality through road fatalities also poses a direct risk to many animal species.

The electrocution risk is considered to be of low probability, however mitigation measures such as bird-friendly monopole structures and perches will further reduce the impact. The position of the proposed power line adjacent to existing power lines presents an opportunity to increase the visibility of both the proposed and existing power line and potentially reduce collisions of heavy-bodied birds, including bustards. The installation of flappers and other BFDs may effectively reduce the probability of collisions by increasing the visibility of both the proposed and the existing power lines. Similarly, should it be feasible to stagger the pylons of the proposed power line in relation to the existing power line this may also increase the visibility of obstacles in the landscape to birds susceptible to collisions.

The position of the proposed grid connection adjacent to existing power lines makes it unlikely that the proposed development will significantly increase the probability of collisions for species of conservation concern beyond that which already exists on the site and indeed may have the potential to reduce it. Following the implementation of mitigation

[19] van Rooyen, C.S. 2004. The Management of Wildlife Interactions with over-headlines. In The fundamentals and practice of Over-head Line Maintenance (132kV and above), pp217-245. Eskom Technology, Services International, Johannesburg.

[20] Shaw J, Reid T, Shutgens M.G., Jenkins A.R. & Ryan P.G. 2018. High power line collision mortality of threatened bustards at a regional scale in the Karoo, South Africa. Ibis 160:431-446 doi:10.1111/ibi.12553.

measures the impacts of direct mortality from the proposed development during the operation phase can be reduced to acceptable levels and the development is unlikely to threaten the long-term viability or persistence of species in the area. The post-mitigation impact significance is therefore likely to be low.

Impact Phase: Operation							
Potential impact description: Direct faunal impacts as a result of collision of birds with power lines, electrocution of fauna on electrical infrastructure and roadkill mortalities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	M	M	M	Negative	**L**	L	M
Can the impact be reversed?	No. Some collisions by species of conservation concern is possible.						
Will impact cause irreplaceable loss of resources?	Potentially. The wider area is important for the conservation of some species of conservation concern.						
Can impact be avoided, managed or mitigated?	Partially. Flappers and other bird flight diverters are not 100% effective at preventing collisions.						

Mitigation measures to reduce residual risk or enhance opportunities:

- Pylons must conform to Eskom standards using bird friendly monopole structures fitted with appropriate bird perches on every pole to reduce the probability of electrocutions;
- The OHPL must be fitted with anti-bird collision line marking devices (e.g. bird flight diverters to mitigate bird collision) for the whole length of the line;
- Pylon tower footprints to be constructed outside of high sensitivity areas (line spans may cross these areas)
- There is opportunity to potentially reduce the risk of collision associated with the both the existing line and the new line by attaching flappers and bird flight diverters (BFDs) to the proposed line;
- The most appropriate and up-to-date marking devices (such as flappers and BFDs) must be selected in consultation with the Endangered Wildlife Trust (EWT);
- Attach appropriate marking devices on all spans of all new power lines in accordance with installation guidelines to increase visibility;
- Flappers and BFDs must be maintained and replaced where necessary, for the life span of the project;
- Ensure that lay-down and other temporary infrastructure are within low sensitivity areas
- An operational monitoring programme must be implemented and include regular monitoring (e.g. during maintenance activities) of the entire length of the power lines for collision and electrocution incidents for the lifespan of the project;
- Any collision incidents must be recorded and reported to the Endangered Wildlife Trust EWT; and
- The potential to stagger pylon towers in relation to the existing power line should be investigated as this may increase the visibility of both existing and new power lines to heavy-bodied flying birds such as bustards;
- All vehicles should adhere to a low speed limit (30km/h) on the project site to avoid collisions with susceptible species;
- General maintenance should be conducted during the dry season where possible;
- Night driving must be avoided where possible;
- Site access should be controlled and no unauthorised persons should be allowed onto the site;
- All personnel should undergo an initial environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes or tortoises;
- The illegal collection, hunting or harvesting of animals at the site should be strictly forbidden; and
- No animals such as dogs or cats to be allowed on site other than those of the landowners.

Impact to be addressed/ further investigated	Yes. The most appropriate and up-to-date flappers and BFDs must be determined in consultation with EWT and installed according to installation guidelines.

9.5 Heritage, Archaeology and Palaeontology

During the construction of the OHPL and associated infrastructure the following physical impacts to the landscape and any heritage resources that lie in or on it can be expected:

- Excavations to construct the foundations for each pylon;
- Levelling of the ground for pylons located on hillsides;
- Construction of roads or tracks to service both the installation of the powerline and its longer term maintenance;
- Creation of working and lay-down areas for the installation of the pylons;
- Introduction of vehicles, machinery and people into environment; and
- Lastly, the introduction of a substantial industrial feature can have an impact on the cultural landscape.

9.5.1 Construction Phase

Impact Phase: Construction							
Potential impact description: Possibility of encountering fossils during groundworks							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	M	L	H
With Mitigation	L	H	L	Neutral/ Positive	**M**	L	H
Can the impact be reversed?			Palaeontological heritage resources are non-renewable and key contextual data for fossils (sedimentology, taphonomy) is difficult to reconstruct following disturbance.				
Will impact cause irreplaceable loss or resources?			Possible but Unlikely – well-preserved, scientifically valuable fossils are scarce within the project area and those that do occur probably occur widely across the region.				
Can impact be avoided, managed or mitigated?			Yes – it can be managed and mitigated through the effective implementation of a Chance Fossil Find Protocol by the ECO and a professional palaeontologist.				
Mitigation measures: General: • Implementation of a Chance Fossil Find Protocol. • Reporting by the ECO of any chance fossil finds to SAHRA and their conservation (preferably in situ). • Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) within the final footprint; and • Curation of any recovered fossil material within an approved repository (museum / university fossil collection) by a qualified palaeontologist.							

Impact Phase: Construction							
Potential impact description: Possible impacts to archaeological sites and material							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	M	L	H
With Mitigation	L	H	L	**Positive**	**M**	L	H
Can the impact be reversed?			No – impacts to archaeological resources cannot be reversed but can be mitigated.				

Will impact cause irreplaceable loss or resources?	No - the archaeological occurrences recorded are well represented in other areas and provided the recommended mitigation measures are implemented, there should be no irreplaceable loss of resources.
Can impact be avoided, managed or mitigated?	Yes – impacts can be avoided or mitigated through the implementation of the mitigation measures listed below.
Mitigation measures: • Do not disturb any old stone kraals or ruins and do not remove stone from walls, or artefacts from the earth. • Report any chance discoveries of human remains to an archaeologist or a heritage authority.	

10 ASSESSMENT OF CUMULATIVE IMPACTS

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

10.1 Soil

It was concluded that the development will pose a low significant impact on soil and agriculture potential of the site. As the soil and agricultural impact of the proposed development is negligible, far more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change are exceeded. Acceptable levels of change in terms of other types of impact, for example visual impact, would be exceeded long before the levels for agricultural impact became an issue. For the above reasons, the cumulative agricultural impact of the proposed development can confidently be assessed as negligible without entering into a more formal assessment.

10.2 Aquatic

In the cumulative assessment of the proposed development, several projects within a 35km radius have been reviewed and or sites accessed during the course of travelling between the various projects. Of these potential projects, aquatic specialist has been involved in the initial EIA aquatic assessments or has managed / assisted with the WUL process for several of them.

All of the projects have indicated that this is also their intention with regard to mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts and improving the drainage or hydrological conditions, with these rivers the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects, and that flows within these systems are sporadic. This is also coupled to fact the several existing Grid connections already occur within the region.

Impact Phase: Cumulative							
Potential impact description: Impact on Aquatic Systems							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**

Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	**L**	L	L
Can the impact be reversed?			Yes, due to the nature of the projects and surrounding aquatic ecosystems				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures to reduce residual risk or enhance opportunities by local land owners and or Provincial / District Roads organizations within the study area: • Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region; and • Install properly sized culverts with erosion protection measures at the present road / track crossings.							

10.3 Terrestrial Ecology

A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other nearby activities as a result of the proposed development. Two operational wind energy facilities occur in the broader area, Longyuan Mulilo De Aar 1 Wind Energy Facility (100MW) and Longyuan Mulilo De Aar 2 North Wind Energy Facility (140MW). When assessed together with other proposed wind energy facilities nearby (e.g. Zingesele WEF) the risks of collisions of birds with infrastructure and electrocution increases the potential to have a cumulatively negative impact on the avifauna of the area.

The addition of the proposed grid connection is however unlikely to significantly increase the cumulative impact on terrestrial fauna, particularly birds if mitigation measures are adhered to.

This is largely due to the proximity of the study site to an existing Hydra MTS, and the large number of associated transmission lines that already exist in the area. The probability that the addition of the proposed development will contribute to an increased cumulative negative impact on the long-term viability of the populations of terrestrial fauna and their persistence in the area is therefore low. This can be further reduced following the implementation of mitigation measures. There is potential for the proposed grid connection to increase the visibility of obstacles in the landscape thereby reducing the potential for avifaunal collisions along the route.

Impact Phase: Operation							
Potential impact description: Cumulative impact of habitat destruction, collisions and electrocution, in the context of existing power lines in the area.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	L	L	M
With Mitigation	M	M	M	Negative	**L**	L	M
Can the impact be reversed?			Unlikely. Reversal would require the decommissioning of all the transmission infrastructure in the area.				
Will impact cause irreplaceable loss of resources?			Unlikely. The impacts associated with the proposed grid connection are already present along the route.				
Can impact be avoided, managed or mitigated?			Partially. Much of the cumulative impact risk already exists along the route and it is unlikely that the proposed development will significantly increase				

	the negative impact on terrestrial animals. The intensity of the cumulative impact can be further reduced if mitigation measures are adhered to.
Mitigation measures to reduce residual risk or enhance opportunities: • The various mitigation and management plans associated with the development outlined above should be followed and implemented effectively to reduce the cumulative contribution of the current development and enhance opportunities.	
Impact to be addressed/ further investigated	Yes. Bird flight diverters as well as optimum pylon positioning and design should be further investigated.

10.4 Heritage, Archaeology and Palaeontology

In respect of potential cumulative impacts on palaeontological resources of the proposed project, the mixed nature of the geology of the area and the low level of surface and near surface exposure of fossil-bearing rocks where they do occur in the area suggests that the cumulative impact will be low.

Archaeological material and historical sites are potentially far more at risk from the cumulative impacts, given its widespread occurrence and exposure across the area. Multiple human activities in the landscape, of which the installation of the grid interconnection is the latest, can erode the integrity of these resources through their physical damage or destruction. While at an individual project level these impacts may not appear to be significant, the cumulative effects of multiple developments or activities on archaeological and historical heritage resources can be high. The implementation of measures to mitigate project level impacts can do much to reduce cumulative impacts.

10.5 Summary of Cumulative Phase Impacts

Cumulative Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Soil and Agricultural Potential							
Change of Land Use and Capability	L	L	L	Negative	L	L	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*L*
Freshwater & Wetlands							
Hydrological conditions	M	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*L*
Ecology							
Habitat destruction, collisions and electrocution, in the context of existing power lines in the area.	M	M	M	Negative	L	L	M
With Mitigation	M	M	M	Negative	**L**	L	M
Heritage: Archaeology and Palaeontology							

Cumulative Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Soil and Agricultural Potential							
Change of Land Use and Capability	L	L	L	Negative	L	L	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*L*
All impacts Archaeology and Palaeontology	M	M	M	Negative	L	L	M
With Mitigation	*M*	*M*	*M*	*Negative*	*L*	*L*	*M*

11 SUMMARY OF FINDINGS AND RECOMMENDATIONS

Figure 11.1 reflects the Environmental Sensitivity of the proposed development and Figure 11.2 and 11.2a - c reflects the Environmental Archaeological Sensitivities.

11.1 Geology, Soil and Agriculture

This assessment has found that the proposed development will have no impact on any arable land. Because of the low agricultural potential of the site, the low agricultural impact potential of the kind of development that is proposed, and the consequent **low** agricultural impact, **there are no restrictions relating to agriculture (including soils) which would preclude authorisation of the proposed development**. The proposed development will not have an unacceptable, negative impact on the agricultural production capability of the site. Therefore, from an agricultural impact point of view, the development should be authorised.

11.2 Freshwater and Wetlands

The proposed development is unlikely to have any impacts on the aquatic environment as for the most part the final placement of the towers would avoid the delineated wetlands and watercourses.

Thus, based on the findings of the specialist study, significance of the impacts assessed for the aquatic systems after mitigation would be **low**. The specialist has **no objection to the authorisation of any of the proposed activities for the proposed development**.

11.3 Flora and Terrestrial Fauna

The low overall footprint of the development within the ESAs, combined with the fact that the proposed route runs adjacent to existing power lines for most of the route means that the development would not compromise the ecological functioning or the long-term conservation value of the area. It was found that the vegetation type found within the study area is largely intact with very little prospect of long-term transformation through agricultural practices, the species and habitats found within these areas are therefore fairly widespread and not unique to the project site. Although the impact assessment table presents low significance after mitigation, it is the opinion of the specialist that the impact of the proposed project is considered to be **low** and acceptable following mitigation.

The power line and associated infrastructure is unlikely to generate significant impacts on flora and fauna after mitigation. No highly significant negative impacts that cannot be

adequately mitigated against were observed, therefore **from a terrestrial flora and fauna perspective there are no reasons to oppose the development**. The development can be supported in terms of its low potential impact to terrestrial ecology.

11.4 Avifauna

By attaching bird flight diverters or flappers to the proposed line and potentially staggering the pylon placement in relation to the existing power line the visibility of the lines may increase for those sections where they run parallel to each other. This has the potential to reduce the risk of collision by birds traversing the area as they are already at risk from existing infrastructure.

A number of Red Data species and species vulnerable to collisions with power lines exist in the area of the proposed power line routes. The impact of collisions to birds has a **Low** significance with the implementation of mitigation measures. Appropriate bird flight diverters, or flappers should be attached to the full length of the proposed power lines, and pylons/towers should be staggered as much as possible in relation to the adjacent, existing power lines. The motivation for this requirement is due to the route being within an Important Bird Area, and being in an area important for collision prone species such as Ludwig's Bustard. The other potential impacts assessed are of **low** significance following the implementation of mitigation measures.

The proposed project is unlikely to generate significant impacts on avifauna after mitigation. No highly significant negative impacts were observed, therefore **from an avifaunal perspective the proposed project can be authorised if all recommendations and mitigation measures are implemented accordingly**.

11.5 Cultural Heritage, Archaeology and Palaeontology

Archaeological resources are widespread but of generally limited significance in the general area of the proposed project. Although palaeontological material is likely to be present in parts of the project footprint, there is a very small chance of fossils being encountered during the construction activities.

The overall impact of the project on heritage resources is assessed to tolerable and generally of medium significance. Provided that the mitigation measures are implemented, the **overall impact of the proposed development is generally of low heritage significance and the proposed activity is considered acceptable**.

12 CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORISATION

Any specific conditions to be included in the Environmental Authorisation as advised by the specialist assessments are provided below:

Aquatic

As the proposed activities have the potential to create erosion the following recommendations are made:

- A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final tower layout as required.
- It is further recommended from the project onset that all watercourse areas (inclusive of buffers) are included into any existing EMPr as reference, this to ensure a net benefit to the aquatic environment. This should from part of the suggested walk down as part of the final EMPr preparation.

Fauna and Flora

- An Erosion Management Plan and Rehabilitation Plan must be produced and included in the EMPr.
- Preconstruction walk-though of the development footprint (pylon bases, new servitudes, lay-down areas and temporary infrastructure) must be conducted for micrositing to ensure that sensitive features such as burrow systems are avoided where possible.
- An operational monitoring programme must be implemented and include regular monitoring (e.g. during maintenance activities) of the entire length of the power lines for collision and electrocution incidents for the lifespan of the project.
- Pylons must conform to Eskom standards using bird friendly monopole structures fitted with appropriate bird perches on every pole to reduce the probability of electrocutions.
- There is opportunity to potentially reduce the risk of collision associated with the both the existing line and the new line by attaching flappers and bird flight diverters (BFDs) to the proposed line.
- The most appropriate and up-to-date marking devices (such as flappers and BFDs) must be selected in consultation with the Endangered Wildlife Trust (EWT);
- Collision incidents and mortalities must be recorded and reported to the Endangered Wildlife Trust (EWT).

Heritage, Archaeology and Palaeontology

- With regard to palaeontological resources, a Fossil Chance Find Reporting Protocol must be implemented at the commencement and for the life of the construction programme. The responsible person/environmental officer must look out for fossils and the Protocol must be implemented should fossils be encountered.
- A walk-down survey of the proposed access road and those portions of the grid connection that could not be surveyed previously must be undertaken by a suitably qualified archaeologist once the positions of the individual grid connection pylons and the final alignment of the access road once have been determined. Micro-siting of pylon positions and the road alignment may be required if material is noted. This should be done in consultation with the project archaeologist.
- In the event of anything unusual being encountered during construction activities, SAHRA must be notified immediately so that mitigatory action can be determined and implemented if necessary. Such mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or palaeontological or archaeological sampling is completed.
- Should any human remains be encountered at any stage during the construction or earthworks associated with the project, work in the vicinity must cease, the remains must be left *in situ* but made secure and the project archaeologist and SAHRA must be notified immediately so that mitigatory action can be determined and be implemented.

13 IMPACT STATEMENT AND CONCLUSION

Based on the assessments conducted, the construction of the OHPL within the assessed corridor, the switching station and the access road is acceptable from an environmental perspective.

No environmental fatal flaws have been identified, and should all the recommended mitigation measures be implemented, it is anticipated that, overall, impacts would low (negative) in significance. In addition, positive impacts were also identified in terms of heritage and palaeontology. These positive impacts will only be realised if the project proceeded. The confidence in the assessment is regarded as acceptable.

The approval of the proposed development is required for the construction of the authorised Mulilo Total Hydra Storage Project (in particular De Aar PV1). The reason for this later application and separation of the project components in terms of the application process rests with the fact that the Environmental Authorisation for the proposed OHPL, switching station and access road have been negotiated and agreed to become the property of Eskom, and would not be controlled by the Applicant.

Taking into consideration the findings of the BA process for the proposed development, it is the opinion of the Environmental Assessment Practitioner (EAP) that the majority of negative impacts associated with the implementation of the proposed project can be mitigated to acceptable levels. While the residual impacts of the project will have a positive socio-economic impact on the local environment, the extent of the benefits associated with the implementation of the projects will benefit a much larger group of people and stakeholders, in terms of renewable energy supply.

Overall, it is recommended that Mulilo Total Hydra Storage Project: Grid Interconnection, and its associated infrastructure is approved (or authorised), subject to implementation of the recommended mitigation measures and management actions contained in this BA report and all the specialist reports and statements, as well as the Generic EMPrs for the OHPL and switching station.

FIGURES

APPENDIX A: EAP DECLARATION OF INDEPENDENCE AND CV

APPENDIX B: GENERIC EMPRS FOR ELECTRICAL INFRASTRUCTURE

APPENDIX C: PUBLIC PARTICIPATION

APPENDIX D: TECHNICAL DESIGN DRAWINGS