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Impofu West Wind Farm and Associated Infrastructure, Oyster Bay in the Eastern Cape

9 October 2018
Revision: 0
Reference: 500571

Draft Scoping Report

Red Cap Impofu West (Pty) Ltd

Bringing ideas to life

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Project details

Comments should be directed to:

Aurecon South Africa (Pty) Ltd
Reg No 1977/003711/07

Aurecon Centre
1 Century City Drive
Waterford Precinct
Century City
Cape Town 7441

PO Box 494
Cape Town 8000
South Africa

Mieke Barry

T 021 526 6025
F 021 526 9500
E Mieke.Barry@aurecongroup.com
W www.aurecongroup.com.

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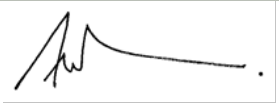
Verifier signature		Approver signature	
Name	Mieke Barry	Name	Andries van der Merwe
Title	Manager, Environment and Planning	Title	Principal, Environment and Planning

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NEMA requirements for Scoping Reports		
Appendix 2	**Content as required by NEMA**	**Section**
2(a)	(i) details of the EAP who prepared the report; and	2.3
	(ii) details of the expertise of the EAP to carry out scoping procedures.	
2(b)	the location of the activity, including-	6.1
	(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 coordinates of the boundary of the property or properties;	N/A
2(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	6.2
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
2(d)	a description of the scope of the proposed activity, including-	6
	(i) all listed and specified activities triggered;	3.2
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	6
2(e)	a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	3
2(f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	6.8
2(h)	a full description of the process followed to reach the proposed preferred activity, site and location within the site, including -	5
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	4.6 and Appendix B
	(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;	4.6
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	7
	(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;	7
	(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;	10
	(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;	7
	(viii) the possible mitigation measures that could be applied and level of residual risk;	7
	(ix) the outcome of the site selection matrix;	N/A
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	5
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	N/A
2(i)	a plan of study for undertaking the environmental impact assessment process to be undertaken, including-	10
	(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	
	(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;	
	(iii) aspects to be assessed by specialists;	
	(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	

	(v) a description of the proposed method of assessing duration and significance;	
	(vi) an indication of the stages at which the competent authority will be consulted;	
	(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and	
	(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;	
	(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts determine the extent of the residual risks that need to be managed and monitored.	
2(j)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix A
	(i) the correctness of the information provided in the report;	
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
2(k)	an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix A
2(l)	where applicable, any specific information required by the competent authority; and	N/A
2(m)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

Contents

Appendices

Figures

Tables

Abbreviations

AIA	Archaeological Impact Assessment
BA	Basic Assessment
BBBEE	Broad-Based Black Economic Empowerment
BPEO	Best Practical Environmental Option
CAA	Civil Aviation Authority
CARA	Conservation of Agricultural Resources Act (43 of 1983)
CBA	Critical Biodiversity Area
COP	Convention of the Parties
CV	*Curriculum Vitae*
DAFF	Department of Agriculture, Forestry and Fisheries
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DEDEAT	Department of Economic Development Environmental Affairs and Tourism
DoE	Department of Energy
DRDAR	Eastern Cape: Department of Rural Development and Agrarian Reform
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water Affairs and Sanitation
EA	Environmental authorisation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (73 of 1989)
EAPAN	Environmental Assessment Professionals of Namibia
ECBCP	Eastern Cape Biodiversity Conservation Plan
ECO	Environmental Control Officer
ECPHA	Eastern Cape Provincial Heritage Resource Authority
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
EMPs	Environmental Management Plans and Programmes
EMS	Environmental management systems
EN	Endangered
ESA	Early Stone Age
ESIA	Environmental and Socio-economic Impact Assessment
GDP	Gross Domestic Product
GN	Government Notice
GPS	Global Positioning System

GW	Gigawatt
Ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IAIAsa	International Association for Impact Assessment South Africa
IAP2	International Association for Public Participation
IBBA	Important Bird and Biodiversity Areas
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
kV	Kilovolt
LC	Least Concern
LED	Local Economic Development
LSA	Late Stone Age
MAP	Mean Annual Precipitation
MSA	Middle Stone Age
MW	Megawatt
NDP	National Development Plan
NEMA	National Environmental Management Act (107 of 1998)
NFA	National Forests Act (84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (25 of 1999)
NMBM	Nelson Mandela Bay Metropolitan Municipality
NRTA	National Road Traffic Act (93 of 1996)
NT	Near Threatened
NWA	National Water Act (36 of 1998)
PE	Port Elizabeth
PES	Present Ecological State
PNCO	Provincial Nature Conservation Ordinance
PPP	Public Participation Process
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
Rpm	Revolutions per minute
S&EIA	Scoping and environmental impact assessment
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SALA	Subdivision of Agricultural Land Act (70 of 1970)
SANRAL	South African National Roads Agency SOC Ltd
SANS	South African National Standard
SBDM	Sarah Baartman District Municipality
SCC	Species of conservation concern

SDF	Spatial Development Framework
SEEDS	Socio-economic and enterprise development strategy
SES	Sustainable Energy Strategy
SKA	Square Kilometre Array
SMMEs	Small, medium, micro enterprises
ToR	Terms of Reference
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
VAC	Visual absorption capacity
VU	Vulnerable
WHCA	World Heritage Convention Act (49 of 1999)
WMA	Water Management Area

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1 Introduction

1.1 Wind energy in South Africa

Due to global concerns such as climate change, and the on-going exploitation of non-renewable resources, there is increasing international pressure on countries to increase their share of renewable energy generation. Renewable energy is recognised internationally as a major contributor in protecting the environment (including biophysical, social and economic), when compared to energy generation that relies on fossil fuels, such as coal fired power stations and the use of oil and gas. Renewable energy projects also provide a wide range of environmental, economic and social benefits that can contribute towards long-term global sustainability.

In South Africa, the national utility company, Eskom, sources up to 86.97% of its electricity needs from fossil-fuels (World Atlas, 2016). Eskom recognises that it "is crucial that the private sector plays a role in addressing the future electricity needs of the country as this would reduce the funding burden on Government, relieve the borrowing requirements of Eskom and introduce generation technologies that Eskom may not consider part of its core function which may play a vital role in the future electricity supply options in the country" (Eskom, 2018).

As a result, the South African Government has developed an Integrated Resource Plan (IRP) (2010) in which a target was set to source 17.8 Gigawatts (GW) of the country's electricity supply from renewable energy sources, over a 20-year period from 2010 to 2030 (IPPPP, 2018). An update to the IRP was drafted by the Department of Energy (DoE) and circulated for a 60-day public comment period in August 2018. The updated IRP indicates that the expected electricity demand for South Africa has decreased and that no new nuclear will be planned up until 2030. Of the new build planned by 2030, 52% (18,746 MW) will come from renewable energy, half of which will be wind energy (9,462 MW).

In support of this strategic target, the Department of Energy (DoE) has to date issued three ministerial determinations for the procurement of 13,225 Megawatt (MW) of renewable energy, *viz.* 3,725 MW by 2016 (1,800 MW of which was allocated for onshore wind technology), 3,200 MW by 2020 (1,470 MW of which will be provided by onshore wind energy) and a further 6,300 MW of renewable energy to be procured by 2025 (3,040 MW of which is allocated to onshore wind power). These renewable energy targets are procured through a competitive tendering process called the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) run by the DoE in conjunction with the National Treasury and the Development Bank of Southern Africa (DBSA) (DoE, 2018).

The proposed Impofu West Wind Farm introduced below would therefore have global significance as it would contribute to South Africa's national commitment to transition to a low carbon economy. Investments in this technology will not only benefit our generation, but many generations to come.

1.2 Introducing the project

Red Cap Energy (Pty) Ltd is overseeing the proposed development of up to three wind farms and associated infrastructure, on adjacent farms near Oyster Bay in the Eastern Cape. These proposed wind farms are named the Impofu West Wind Farm, the Impofu East Wind Farm and the Impofu North Wind Farm, and are referred to collectively as the Impofu Wind Farms. The consolidated site of the Impofu Wind Farms is bounded by the operational Tsitsikamma Community Wind Farm to the west, the Gibson Bay Wind Farm to the south-west, and the Kouga Wind Farm to the south-east (see Figure 1.1 and Figure 1.2). This area lies on a section of coastal plain with the ocean on either side which results in excellent wind conditions and low levels of turbulence, making it one of the best wind resources in the country and ideal for wind farm development.

Aurecon South Africa (Pty) Ltd was appointed as an independent company, to conduct the Environmental Impact Assessment (EIA) process for the proposed Impofu Wind Farms, and separate Basic Assessment (BA) process for the associated Grid Connection Project. This is to evaluate the potential biophysical and socio-economic impacts associated with the project and to ensure compliance with the relevant environmental legislation.

The Impofu Wind Farms are proposed on a consolidated site of approximately 15,500 hectares (ha), with the Impofu West Wind Farm in the south-western extent of the site. Adjacent and north of that is the proposed Impofu North Wind Farm, with the Impofu East Wind Farm to the east. Each of these Wind Farms will undergo a separate environmental authorisation process. This report provides information relating to the proposed Impofu West Wind Farm.

The proponent, *Red Cap Impofu West (Pty) Ltd*, proposes to develop the Impofu West Wind Farm, which is located within the Kouga Local Municipality (within the Sarah Baartman District Municipality). The Impofu West site is centred on 34°6'32.7" South latitude and 24°31'39.17" East longitude, and is approximately 14 kilometres (km) north-west of Oyster Bay. The Impofu West Wind Farm footprint s is approximately 2,760 hectares (ha) in extent, comprising eight adjoining farm portions, refer to Section 6.1 for further details.

Energy generated by the Impofu West Wind Farm (hereafter referred to as the project) will be evacuated from the site via a proposed 132 kilovolt (kV) overhead powerline, approximately 120 km in length, that would feed into the national electricity grid at the Nelson Mandela Bay Metropolitan Municipality (NMBM) Chatty substation, in Port Elizabeth. The routing of this Grid Connection and the associated impacts are currently being investigated via a separate BA impact assessment.

Additional ancillary infrastructure for the Impofu West Wind Farm would include underground and above-ground cabling between project components, onsite substation/s, foundations to support turbine towers, hardstands to support cranes at each turbine, and permanent operations/maintenance buildings, office and workshop areas. Service and access roads will be constructed in addition to upgrading existing roads, with the relevant stormwater infrastructure and gates constructed as required. Formal laydown areas for the construction period, containing temporary maintenance and storage buildings along with guard cabins, will be established. These have been further explained in Section 3.

Since the project is associated with energy generation, and energy projects are dealt with by the national authority, the competent authority for this project is the National Department of Environmental Affairs (DEA). The DEA has indicated that each of the three proposed Impofu Wind Farms and the Grid Connection must be subject to its own EIA/ BA process and that separate EIA/ BA reports must be submitted to the competent authority for consideration.

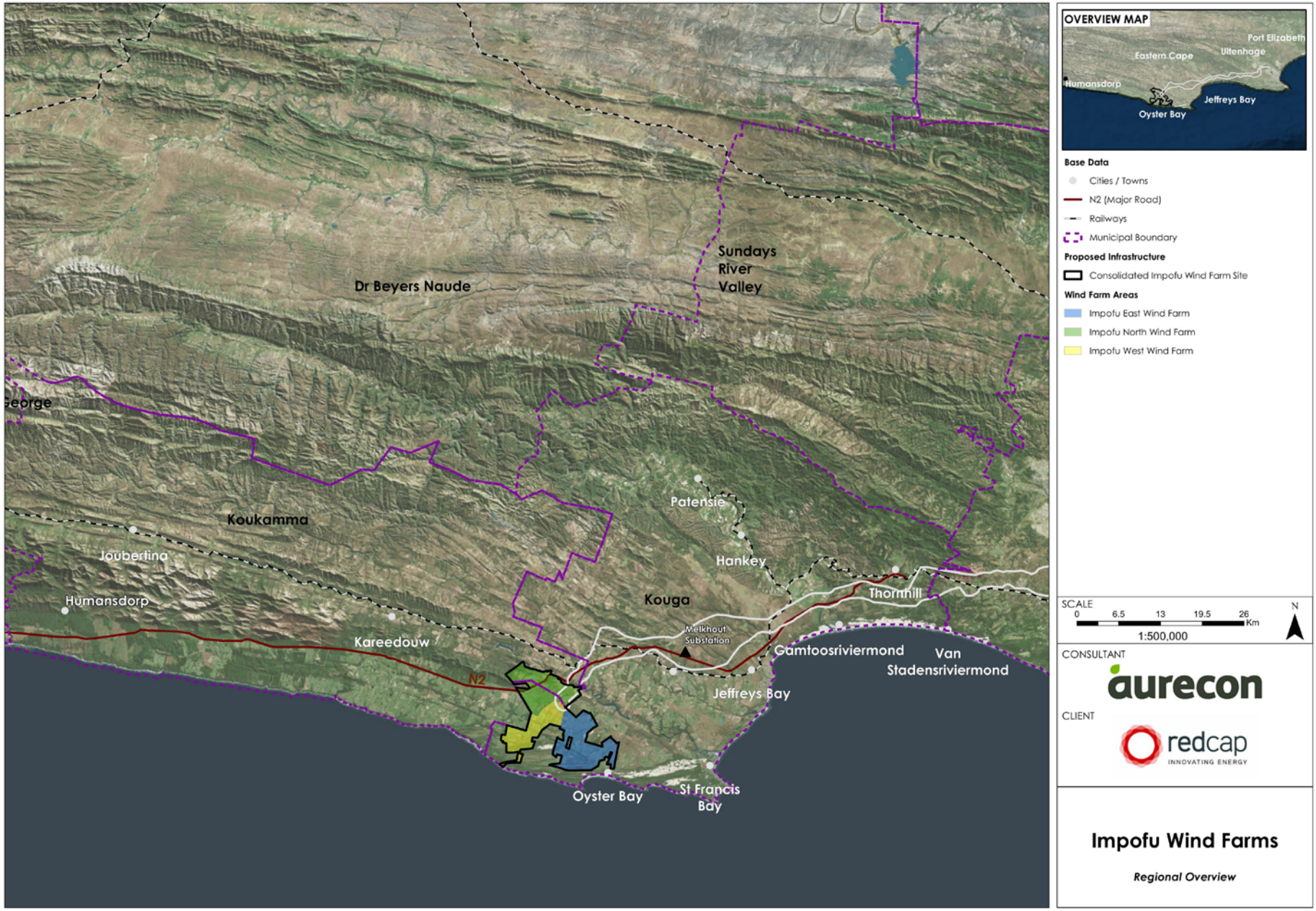

Figure 1.1: Regional locality map

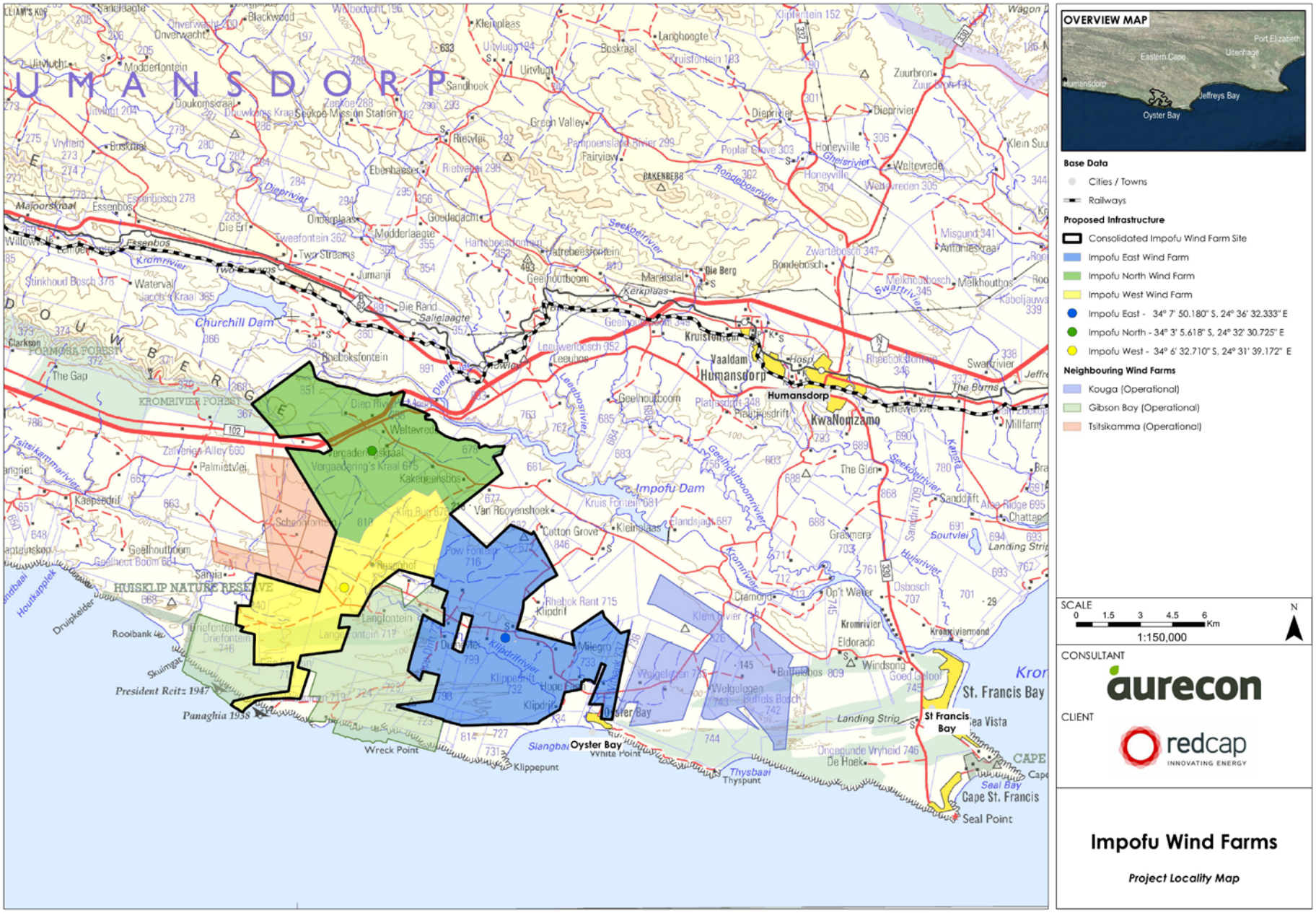

Figure 1.2: Project locality map

1.3 The Scoping and EIA process

The project involves a number of 'listed activities' in terms of Section 24(5) of the National Environmental Management Act (107 of 1998) (NEMA), 'EIA Regulations' published in Government Notice (GN) No. R982, R983, R984 and R985 in the Government Gazette of 8 December 2014, as amended. Accordingly, the proposed project requires environmental authorisation before any activities can commence.

As the project is for the development of a wind farm of more than 20 MW (GN R984), a Scoping and EIA process is required. This project also includes a number of activities listed under GN R983 and R985 which collectively form part of the proposal. All the identified listed activities are set out in Table 3.2 in Section 5. The EIA process entails a number of phases, which are discussed in further detail in Section 4. This report serves to document the Draft Scoping Phase of the EIA.

The Public Participation Process (PPP) forms a critical component of the environmental authorisation process and is undertaken in parallel to Scoping and EIA to iteratively inform the process. Due to the complexity of this project and high number of Interested and Affected Parties (I&APs) in the area, this project has undergone significant pre-application PPP. At this stage, prior to circulation of this report, the project has been advertised, I&APs have been informed of the proposed development and were invited to register their interest in and/or provide comments on the project. Focus Group Meetings with key stakeholders were also undertaken to notify the public of the project. A Pre-Application Scoping Report was circulated for a period of five weeks (from 1 August to 7 September 2018) and three public open house meetings were held during the five week period. Refer to Section 4.6 and Appendix B for more information.

1.4 Purpose of the Scoping Report

As scoping is an iterative process, the purpose of this Draft Scoping Report[1] is to provide the background to the project and the work undertaken to date, as well as outline the scope of work to be undertaken in the EIA phase. More specifically, this report documents the process undertaken to date including the approach to alternatives, a profile of the existing study area, identifies any issues and potential impacts on the environment, and sets out the way forward and Plan of Study for the EIA. The Plan of Study outlines how the EIA is to be undertaken and prescribes the roles and responsibilities of parties involved.

Accordingly, the Scoping Report provides details of:

- **Section 1 – Introduction:** introduces the project in the context of the renewable energy industry in South Africa and provides an indication of the environmental process to be undertaken for the project.
- **Section 2 – Role-players:** introduces the different role-players involved in the environmental authorisation process.
- **Section 3 – Legal and planning context:** provides an outline and analysis of the legal framework and policies relevant to the project.
- **Section 4 – EIA process and approach:** focusses on the EIA methodology, detailing the phases of the EIA as well as the PPP, and any assumptions and limitations associated with the project.
- **Section 5 - Alternatives rationale:** provides a summary of the detailed screening that has been undertaken for the project to date and a motivation as to why alternatives have not been considered.
- **Section 6 – Project description:** outlines the nature of the proposed activities, specific to the Impofu West Wind Farm, and then considers the need for the proposed project.
- **Section 7 – Baseline environment and potential impacts:** provides a description of the current state of the affected environment as well as a description of the potential impacts that could result from the

[1] Appendix 2 of amended EIA Regulations (GN R982) of NEMA lists the content required in a Scoping Report. This has been listed for cross checking purposes on the page preceding the table of contents.

proposed project, drawn from the respective specialist studies undertaken to date (attached in Appendix C).

- **Section 8 – Cumulative impact assessment:** provides a description of the methodology and anticipated cumulative impacts associated with the proposed project.
- **Section 9 – Conclusion:** summarises the potential environmental issues and impacts that could arise from the project and the way forward.
- **Section 10 – Plan of Study for the EIA:** the purpose of this Section is to detail the Plan of Study for the EIA Phase.
- **Section 11 – References:** collates the reference material and literature used to inform report.

2 Role-players

2.1 Introduction

There are a number of role-players involved in the environmental application process. The details of each are set out below, based on the definitions and requirements within GN R982 (2014) of NEMA.

2.2 Proponent

The proponent "*means a person intending to submit an application for environmental authorisation and is referred to an applicant once such application for environmental authorisation has been submitted*".

Red Cap Impofu West (Pty) Ltd, hereafter referred to as Red Cap is the proponent and applicant for this proposed project.

2.3 The Environmental Assessment Practitioner

The Environmental Assessment Practitioner (EAP) means "*the individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations*".

It is the role of the independent Environmental Assessment Practitioner (EAP) to manage and undertake the application for environmental authorisation for the project on behalf of the applicant, as required in terms of NEMA, as amended. Mieke Barry from Aurecon is the responsible EAP and has relied on inputs from a selected team of highly experienced specialists and multi-disciplinary practitioners to execute the project in a professional and unbiased manner. Neither Aurecon nor any of its sub-consultants are subsidiaries of Red Cap. Furthermore, all these parties do not have any interest in secondary or downstream developments that may arise out of the authorisation of the proposed project.

The contact details of the EAP are provided in Table 2.1, and the expertise of the individuals responsible for the process are presented in Table 2.2.

Table 2.1: Contact details of the EAP

Name:	Mieke Barry
Company:	Aurecon South Africa (Pty) Ltd
Postal Address:	PO Box 494, Cape Town 8000 South Africa
Telephone Number:	(021) 526 6025
Fax Number:	(021) 526 9500
Email Address:	Mieke.Barry@aurecongroup.com

Aurecon's environmental management systems (EMS) policy provides a quality management system which includes a number of tiers with various responsibilities for each job grade level based on experience in the environmental field. This requires environmental practitioners to prepare reports and gain experience whilst being guided by a senior colleague. The principal consultant would therefore act as a project leader, managing the EIA process, reviewing the reports and signing off on the requisite reports. This would include signing the declarations and taking responsibility for the EIA process. Refer to Appendix A for the signed declaration of interest of the EAP as well as the full CVs of the EAPs involved in the EIA process.

Table 2.2: Expertise of the EAPs

EAP	Mieke Barry	Kirsten Jones	Kim White
Role	Project Leader	Technical Lead	Technical Lead
Qualifications	MA Environment and Society	MSc (Environmental Science)	BSc (Hons): Environmental and Geographical Science
Years of experience	15	12	5
Environmental management experience	Environmental Impact assessment (EIA), Environmental and socio-economic impact assessment (ESIA), Environmental pre-feasibility and scoping studies, Basic assessment reports (BARs), Environmental management plans and programmes (EMPs/EMPrs), Screening studies and constraints analyses / feasibility assessments, and Public participation processes	Environmental and socio-economic impact assessment (ESIA), Scoping and environmental impact assessment (S&EIA) reports, Basic assessment reports (BARs), Environmental management plans and programmes (EMPs/EMPrs), Screening studies and constraints analyses / feasibility assessments, and Public participation processes	Scoping and environmental impact assessment (S&EIA) reports, Basic assessment reports (BARs), Environmental management plans and programmes (EMPs/EMPrs), Screening studies and constraints analyses / feasibility assessments, Landfill rehabilitation cost provisioning, and Public participation processes
Industries of experience	Energy including renewables, oil and gas, mining, linear and urban regeneration projects	Energy (renewable, gas, and transmission), mining, roads and bridges and urban regeneration projects	Renewable energy, powerlines, mining, wetland rehabilitation projects, roads and waste
Countries of experience	South Africa, Mozambique, Namibia, UK, Azerbaijan and Bulgaria	South Africa, Namibia, Mozambique, Nigeria, UK	South Africa, Angola and Namibia
Memberships	Ordinary Member: Lead Practitioner and Reviewer, Environmental Assessment Professionals of Namibia (EAPAN) International Association for Impact Assessment South Africa (IAIAsa)	Professional natural scientist with the South African Council for Natural Scientific Professions (SACNASP), International Association for Impact Assessment South Africa (IAIAsa), and International Association for Public Participation (IAP2)	Registered candidate natural scientist with the South African Council for Natural Scientific Professions (SACNASP), International Association for Impact Assessment South Africa (IAIAsa)

2.4 Specialists

A specialist means "*means a person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies*".

Several specialist disciplines have been identified as relevant to the nature of the proposed development and the receiving environment. Specialists have been appointed directly by the proponent to undertake the necessary studies specific to their discipline and their inputs have been a key informant to the iterative design process undertaken to date. The specialist CVs, or summaries thereof, are included in their respective reports, in Appendix C, and their details are set out in Table 2.3 below.

Table 2.3: Details of the specialists

Specialist field	Consultant	Company
Terrestrial ecology	Simon Todd	3Foxes Biodiversity Solutions (Pty) Ltd
Aquatic ecology	Dr Brian Colloty	Scherman, Colloty and Associates
Bats	Werner Marais	Animalia consultants
Avifauna	Jon Smallie	Wildskies ecological services
Agriculture	Johann Lanz	Independent consultant
Socio-economic	Matthew Keeley and Thomas Parsons	Urban-Econ Development Economists
Palaeontology	Dr John Almond	Natura Viva
Archaeology	Dr Peter Nilssen	Independent consultant
Noise and shadow flicker	Astrid Peeters and Lien Van Breusegem	3E
Visual	Quinton Lawson and Bernard Oberholzer	Quinton Lawson, Architect and Bernard Oberholzer, Landscape Architect

The EIA Regulations set out the content requirements for Specialist's Reports (Appendix 6 of GN R982). These have been applied to the assessment reports undertaken to date.

2.5 Interested and Affected Parties

Interested and Affected Party (I&AP), "*for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24(4)(a)(v), and which includes-*

- *any person, group of persons or organisation interested in or affected by such operation or activity; and*
- *any organ of state that may have jurisdiction over any aspect of the operation or activity*."

Details of the principles and processes for stakeholder engagement are set out in Section 4.6 and Appendix B, which includes a database of all I&APs involved in the Draft Scoping Phase thus far.

2.6 Competent authority

A competent authority, "*in respect of a listed activity or specified activity, means the organ of state charged by this Act with evaluating the environmental impact of that activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity*".

In this case, the competent authority is the Department of Environmental Affairs (DEA) and their details are set out in Table 2.4 below, whilst their duties are described further in Section 4.

Table 2.4: Competent authority details

Name:	Department of Environmental Affairs (DEA): Integrated Environmental Authorisations	
Contact:	Thabile Sangweni (Case officer)	Muhammad Essop
Postal Address:	Private Bag X447, Pretoria, 0001	
Physical Address:	473 Steve Biko Road, Arcadia Pretoria, 0001	
Telephone Number:	012 399 9409	012 399 9406
Fax Number:	012 359 3625	
Email Address:	TSangweni@environment.gov.za	MEssop@environment.gov.za

3 Legal and planning context

The proposed Impofu West Wind Farm and associated activities are governed by various pieces of legislation and a number of policy documents as detailed in the section below.

3.1 Relevant legislation

An overview of the legislation that governs development is provided in Table 3.1 based on the relevancy to the project.

Table 3.1: Relevant legislation

Legislation	Relevant organ of state / authority	Relevance
Aviation Act (74 of 1962)	Civil Aviation Authority (CAA)	Wind turbine generators may potentially interfere with radio navigation equipment. Turbines are also considered to be potential physical obstacles and may need to be a certain colour (white) or fitted with aviation warning lights as required by the CAA. Comment on the project will be sought from the CAA as part of the public participation process (see Appendix B), and an application for approval of the final site layout will be submitted to the CAA by the Proponent. This approval will form part of the requirements for the bid submission in terms of the REIPPPP.
Conservation of Agricultural Resources Act (43 of 1983) (CARA)	Department of Agriculture, Forestry and Fisheries (DAFF)	The purpose of this Act is to ensure that natural agricultural resources of South Africa are conserved through maintaining the production potential of land, combating and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants. Most of the provisions are accounted for in more recent legislation such as NEMBA and NEMA and no applications are required in terms of this Act. Measures to mitigate potential impacts on agricultural resources, such as soil erosion, alien invasion and protection of vegetation and water resources, will be addressed in the EIA Phase and included in the Environmental Management Programme (EMPr).
Subdivision of Agricultural Land Act (70 of 1970) (SALA)	Department of Agriculture, Forestry and Fisheries (DAFF)	The purpose of this Act is to control the subdivision and, in connection therewith, the use of agricultural land. Applications should be made to DAFF allow for the subdivision of agricultural land, as well as other prohibited actions in terms of the Act. An application will thus be made to DAFF to authorise actions in relation to this project. A case study is underway to determine the actual impacts versus the anticipated impacts of operational renewable energy developments on agricultural resources in the Kouga area, which will motivate for the project and its contribution to agricultural productivity.
Eastern Cape Biodiversity Conservation Plan, 2007 (ECBCP)	Department of Economic Development Environmental Affairs and Tourism (DEDEAT)	The ECBCP has no legal standing as it has not yet been declared a bioregional plan in terms of NEMBA. However, since the ECBCP identifies CBAs and provide guidelines with regards to acceptable land uses, the document is an important guideline when considering the linkages between catchments, important rivers and sensitive estuaries since land transformation can result in fragmented landscapes and loss of ecosystem connectivity. The 2007 Plan is in the process of being updated and is also not yet gazetted.

Legislation	Relevant organ of state / authority	Relevance
Environmental Conservation Act (73 of 1989) (ECA)	DEA	In terms of Section 25 of the ECA, the national Noise Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCR) was promulgated. The NCRs were revised under Government Notice Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. In accordance with the Act, two procedures exist for assessing and controlling noise, respectively: • South African National Standard (SANS) 10328:2008 'Methods for environmental noise impact assessments'. • SANS 10103:2004 'The measurement and rating of environmental noise with respect to annoyance and to speech communication' • Other South African National Standards. The proposed development is likely to increase noise levels during operation as well as possible construction noises. Noise emitted by wind farms include aerodynamic sources due to the passage of air over the wind turbine blades and mechanical sources which are associated with components of the power train within the turbine, such as the gearbox and generator and control equipment for yaw, blade pitch, etc. The study includes a noise specialist study in accordance with the relevant SANS.
National Environmental Management Act (107 of 1998) (NEMA), as amended	DEA	The National Environmental Management Act 107 of 1998 (NEMA) provides the framework for environmental decision-making in the country and specifically the EIA Regulations (GN No. R982 in the Government Gazette of 8 December 2014, as amended) serve as the instrument through which development decisions can be made. Specifically, for those developments which comprise certain 'listed activities' identified in GN R983, R984 and R985, as amended, that are considered to have potentially detrimental impacts on the environment. Several listed activities (detailed in Section 5.2 below) have been triggered by the proposed wind farm in terms of the 2014 EIA Regulations (GN R982, as amended). As these activities are listed in GN R983, GN R 984 and GN R985 (as amended), the application for environmental authorisation must consist of a Scoping and EIR process. The Act also sets out various principles that have been adopted in this Scoping and EIR process, such as the precautionary principle duty of care, and polluter pays principle.
National Environmental Management: Biodiversity Act (10 of 2004) (NEMBA)	DEA	The Act calls for the management of all biodiversity within South Africa. The 2007 Threatened or Protected Species Regulations (GN R150, as amended) provides protection through a permit system as well as through the identification of restricted activities. If required, the relevant permits will be applied for. The Act also provides for duty of care with regards to control of alien species. The potential impacts associated with this, as well as the mitigation measures to address the impacts are assessed as above, as part of the Scoping and EIR process. The study also includes a terrestrial ecology specialist study.
National Heritage Resources Act (25 of 1999) (NHRA)	South African Heritage Resource Agency (SAHRA)	In terms of the National Heritage Resources Act (25 of 1999) (NHRA), any person who intends to undertake *"any development … which will change the character of a site exceeding 5,000 m^2 in extent", "the construction of a road…powerline, or*

Legislation	Relevant organ of state / authority	Relevance
	Eastern Cape Provincial Heritage Resource Authority (ECPHRA)	*pipeline…exceeding 300 m in length"* must at the very earliest stages of initiating the development notify the responsible heritage resources authority, namely SAHRA or the relevant provincial heritage agency. The relevant provincial heritage agency (ECPHRA) has indicated that a full Heritage Impact Assessment (HIA) is not required, only a palaeontological and archaeological study is to be submitted for approval.
National Road Traffic Act (93 of 1996) (NRTA)	Department Roads and Public Works, Eastern Cape	Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed in the Regulations of the NRTA. Due to the large size of many of the facility's components (e.g. tower and blades), they will need to be transported via "abnormal loads". The site is directly adjacent to the N2 therefore providing easy access from national roads. Some roads have been identified for upgrade to ensure that the heavy vehicles can reach the site. SANRAL and the Eastern Cape Department of Roads and Public Works will be provided with an opportunity to comment during the Scoping Report PPP and will be followed up through the PPP for the EIA Report.
National Water Act (36 of 1998) (NWA)	Department of Water and Sanitation (DWS)	Section 21 of the NWA recognises and defines water uses that require the approval of DWS in the form of a General Authorisation or Water Use Licence. There are restrictions on the extent and scale of identified activities, determined through a risk assessment, for which General Authorisations apply. The project may constitute the following water uses in terms of Section 21 of the Act: (a) Abstraction of water from boreholes and rivers or dams; (b) Storage of water (dams or reservoirs); (c) Impeding or diverting flows when construction occurs within a watercourse or within 500 m of a wetland; (g) Storage of domestic waste in conservancy tanks; and (i) Alteration of the bed or banks of a watercourse of any activities within 500 m of a wetland.
The National Energy Act (34 of 2008)	Department of Energy (DoE)	One of the requirements for the REIPPPP is for the Proponent to hold an environmental authorisation for the proposed project. As detailed in Section 4, an application for EA requires a Scoping and EIR process to be undertaken. The REIPPPP is guided by the National Energy Act, one of the purposes of which is to promote sustainable development of renewable energy infrastructure.
World Heritage Convention Act (49 of 1999) (WHCA)	World Heritage Convention	The objectives of this Act are to provide for the cultural and environmental protection and sustainable development of, and related activities within World Heritage Sites and giving effect to the values of the Convention. The proposed site does not include any World Heritage Sites. The Klasies River Cave complex, a National Heritage Site, is however approximately 8 km west of the south-west boundary of the site and has been nominated for World Heritage Site status with the United Nations Educational, Scientific and Cultural Organisation (UNESCO).
National Forests Act (84 of 1998), as amended (NFA)	Department of Agriculture, Forestry and Fisheries (DAFF)	There are 47 protected tree species in terms of the NFA, that may not be cut, destroyed, damaged or removed unless a permit has been granted by the DAFF. Within the site there are some indigenous forest patches along drainage lines and steeper slopes

Legislation	Relevant organ of state / authority	Relevance
		which may be affected, in which case a permit from DAFF would be required.
Nature and Environmental Conservation Ordinance (19 of 1974)	Department of Economic Development Environmental Affairs and Tourism (DEDEAT)	Any endangered or protected plant species listed in Schedules 3 and 4 of this Act, shall not be picked or removed without the relevant permit. Such species have been identified on site and therefore a permit will be required.

3.2 National Environmental Management Act (NEMA)

Several listed activities will be triggered in terms of GN R 983, GN R984 and GNR 985 (as amended) and need to be authorised for the proposed development. Based on the listed activities triggered, the application for environmental authorisation will follow the Scoping and Environmental Impact Report (EIR) process as set out in Regulations 21-24 of GN R982. These activities are listed in Table 3.2 below.

Table 3.2: Listed activities in terms of the NEMA 2014 EIA Regulations

No.	Listed Activity	Description of the project component to which the listed activity relates
GN R983 (as amended), 8 December 2014		
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 kV; (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is - (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The site is currently zoned as agricultural land and falls outside the urban area. Underground and overhead medium voltage power lines (33 kV or lower) and 132 kV substations (including control, operation, workshop, storage buildings / areas) will be required for the Impofu West Wind Farm.
12	The development of – (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs – (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 m of a water course, measured from the edge of a watercourse; - excluding—	The proposed site is characterised by drainage lines and watercourses scattered across the site. One or more roads and/or powerlines are likely to cross these watercourses or drainage lines or be within 32 m thereof. Where feasible, the development layout has however made use of as many existing farm tracks as possible and tries to minimise any new impacts on these watercourses and drainage lines.

No.	Listed Activity	Description of the project component to which the listed activity relates
	(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; [or] (ee) where such development occurs within existing roads, [or] road reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
19	The infilling or depositing of any material of more than 10 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m^3 from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or falls within the ambit of activity 21 in this Notice, in which case that activity applies.	A number of internal roads and access roads are likely to cross watercourses and drainage lines. The infilling or depositing of any material of more than 10 m^3 into a watercourse may be triggered with the construction of internal service roads or underground cables crossing the drainage lines.
24	The development of a road – (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 of Government Notice 387 of 2006 or activity 18 I Government Notice 545 of 2010; or (ii) with a reserve wider than 13.5 m, or where no reserve exists where the road is wider than 8 m; but excluding a road – (a) which is identified and include in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban rea; or (c) which is 1 km or shorter.	Permanent roads of approximately 6 m wide will be needed. During Construction roads of approximately 8 m in width, with a reserve / buffer of approximately 12 m may also be required for crawler cranes for the proposed project.
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 1 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 ha; excluding where such land has already been developed for residential, missed retail, commercial, industrial or institutional purposes.	The proposed site is zoned as agricultural land and will continue to be used for agricultural purposes should the proposed Impofu West Wind Farm receive environmental authorisation.

No.	Listed Activity	Description of the project component to which the listed activity relates
56	The widening of a road by more than 6 m, or lengthening of a road by more than 1 km – (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 roads would be used as far as practically possible and feasible, but may likely require widening up to 6 m and/or lengthening by more than 1 km, to accommodate the movement of heavy vehicles and cable trenching activities. Access roads of approximately 8 m in width, with a reserve / buffer of approximately 12 m may also be required during construction.
GN R984, (as amended), 8 December 2014		
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 MW or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs; (a) within an urban area; or (b) on existing infrastructure.	The proposed Impofu West Wind Farm would have a maximum generation capacity of up to 205 MW.
GN R985 (as amended), 8 December 2014		
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. **a. Eastern Cape** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an international convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; (hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or (ii) In an estuarine functional zone, excluding areas falling behind the development setback line;	Access roads of approximately 8 m in width, with a reserve / buffer of approximately 12 m may also be required during construction. The wind farm is located approximately 2 km east of the formally protected Huisklip Nature Reserve.
18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **a. Eastern Cape** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;	Existing roads would be used as far as practically possible and feasible, but may likely require widening up to 6 m and/or lengthening by more than 1 km, to accommodate the movement of heavy vehicles and cable trenching activities. Access roads of approximately 8 m in width, with a reserve / buffer of approximately 12 m may also be required.

No.	Listed Activity	Description of the project component to which the listed activity relates
	(dd) Sites or areas identified in terms of an international convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; (hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; (ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; (jj) An estuarine functional zone, excluding areas falling behind the development setback line; or (kk) A watercourse; or ii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.	Some of these roads may be located within 100 m of watercourses (drainage lines) on the site, and some crossings may be required.

3.3 Policy

In South Africa, the national utility company, Eskom, sources up to 86.97% of its electricity needs from fossil-fuels. Against the backdrop of heightened climate change awareness and a growing concern around the reliance and environmental impacts of using fossil fuels, as well as an increasing projected electricity demand in the country, a number of policies were developed that aim at diversifying the electricity generation mix for South Africa. These include the White Paper on the Energy Policy of the Republic of South Africa (1998), the White Paper on Renewable Energy (2003) and the National Climate Change Response Policy White Paper (2011) (see Figure 3.1).

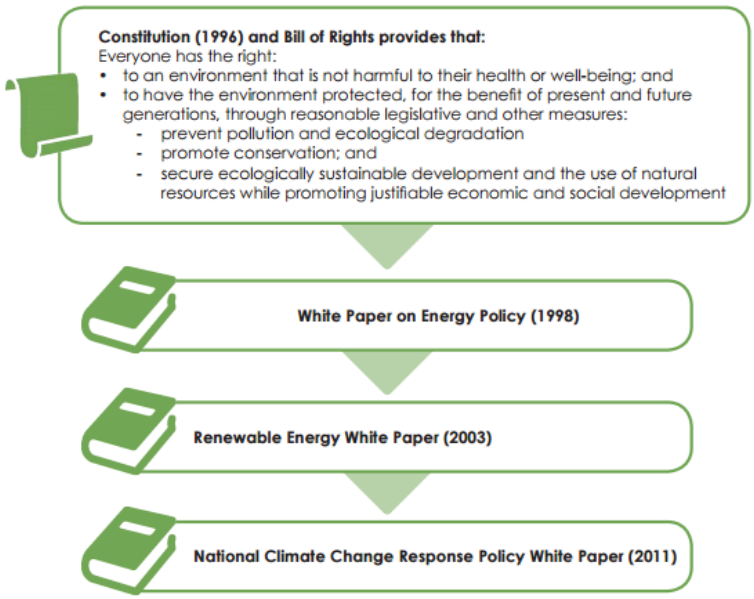

Figure 3.1: Key policies for initiating renewable energy in South Africa (DoE, 2015)

However, despite the proactive policy stance from the early 2000s, by the end of the decade there was an electricity shortage that resulted in rolling black outs in 2008. In direct response to these electricity shortages, the Integrated Resource Plan (IRP) (2010) was issued as a medium-term strategy which set the target for renewable energy supply to 17.8 GW over a 20-year period from 2010 to 2030. An update to the IRP was drafted by the Department of Energy (DoE) and circulated for a 60-day public comment period in August 2018. The updated IRP indicates that the expected electricity demand for South Africa has decreased and that no new nuclear will be planned up until 2030. Of the new build planned by 2030, 52% (18,746 MW) will come from renewable energy, half of which will be wind energy (9,462 MW). These renewable energy targets are procured through a competitive tendering process called the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) run by the DoE. The success of this programme has been internationally recognised, with the United Nations Environmental Programme (UNEP) 2014 Report placing South Africa among the top-10 countries in respect to renewable energy investment.

In South Africa, renewable energy forms an important part of our energy mix. One of the reasons for this is the substantial foreign equity and financing that has been invested in Renewable Energy Independent Power Producer projects by December 2017 (viz. R48.7 billion)[2]. Additionally, beyond the foreign investment, localised socio-economic benefits have also been realised through job creation, skills development as well as the establishment of Community Trusts. Approximately 30,763 construction and 4,938, operational job years[3] for South African citizens have been created to date[4].

The proposed Impofu West Wind Farm would therefore have both national and global significance as it aligns with national policy direction as well as contributing to South Africa being able to meet some of its international climate change obligations, by aligning domestic policy with internationally agreed strategies and standards as those set by the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, as well as the recent Convention of the Parties (COP) 21 in Paris 2015, to all of which South Africa is a signatory.

Summary: National policy framework governing renewable energy in South Africa

- White Paper on the Energy Policy of the Republic of South Africa (December 1998)
- Renewable Energy White Paper (2003)
- National Climate Change Response Policy White Paper (2011)
- National Integrated Resource Plan (IRP) (2010)
- Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

3.4 Planning Context

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)
- National Integrated Resource Plan for Electricity (2010-2013) and updated Draft IRP (2018);
- National Infrastructure Plan;
- Eastern Cape Provincial Economic Development Strategy (PEDS), 2017
- Eastern Cape Sustainable Energy Strategy (SES), 2012; and
- Eastern Cape Climate Change Response Strategy 2011.

More specifically, the proposed Impofu West Wind Farm falls within the jurisdiction of the Kouga Local Municipality and the Sarah Baartman District Municipality. An evaluation of the 'need and desirability' of the project (Section 6.8) considers the strategic context of the project with regards to the municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) as follows:

- Sarah Baartman IDP 2017-2020

[2] IPPPP Quarterly Report, 31 March 2018. Downloaded from: https://ipp-projects.co.za/Publications on 1 October 2018.
[3] A job year is the equivalent of a full time employment opportunity for one person for one year.
[4] IPPPP Quarterly Report, 31 March 2018. Downloaded from: https://ipp-projects.co.za/Publications on 1 October 2018.

- Sarah Baartman SDF 2013
- Kouga IDP 2017-2022
- Kouga SDF 2015

4 EIA process and approach

4.1 Introduction

Red Cap have proactively sought to identify the best practical environmental option possible for the identified project site through a rigorous, iterative and multi-disciplinary process, that drew on the considerable body of existing knowledge and specialist expertise relating to the study area. This approach aligns with the NEMA principles advocating for sustainable development through the adoption of the mitigation hierarchy as set out in section 2 of NEMA and depicted in Figure 4.1. Through application of this hierarchy, 'avoidance' of environmental impacts was then the basis for the approach to the process.

Figure 4.1: Mitigation hierarchy

As the EIA process ascribes stringent timeframes for Scoping and EIA, the approach has been to allow for as much detailed investigation and participation of I&APs upfront as possible, prior to commencement of the legal timeframes when an Application for environmental authorisation is submitted. Therefore, the Pre-Application Phase involved a lengthy and detailed Screening and Iterative Design Process and public participation.

As outlined in Figure 4.2 there are five distinct phases in this EIA process, namely the Screening Phase, Iterative Design Phase, the Pre-Application Phase, and then the formal Scoping Phase(the current phase and basis of this report) followed by the EIR Phase.

4.2 Screening and Iterative Design Phase

The Screening and Iterative Design processes were overlapping and is described in detail in Section 5, which motivates why only the No-Go alternative is being assessed in the EIA and how the best practical environmental option was identified.

These phases also included for the following activities:

- A Pre-Application meeting was held with DEA on 17 October 2017 and the minutes are attached in Appendix B. The information gathered was used in refining the Plan of Study for the EIA process and Terms of Reference (ToR) for the specialist studies; and
- A round of public participation as detailed below in Section 4.6 was held (in December 2017 – March 2018) and included focus group meetings with key I&APs.

The outcome of this phase was a proposed site layout for the project which could be assessed by the team of specialists. Although the layout had not been subject to PPP, the project had conceptually been presented to I&APs for comment during the I&AP registration period and focus group meetings. One example of how the input of I&APs has influenced the design quite significantly was the discovery of the Martial Eagle nest on Impofu Dam. The avifauna specialist went searching for this nest as it was reported that there had been sightings of a Martial Eagle in this area. On this basis the entire consolidated site was redesigned to avoid the nest.

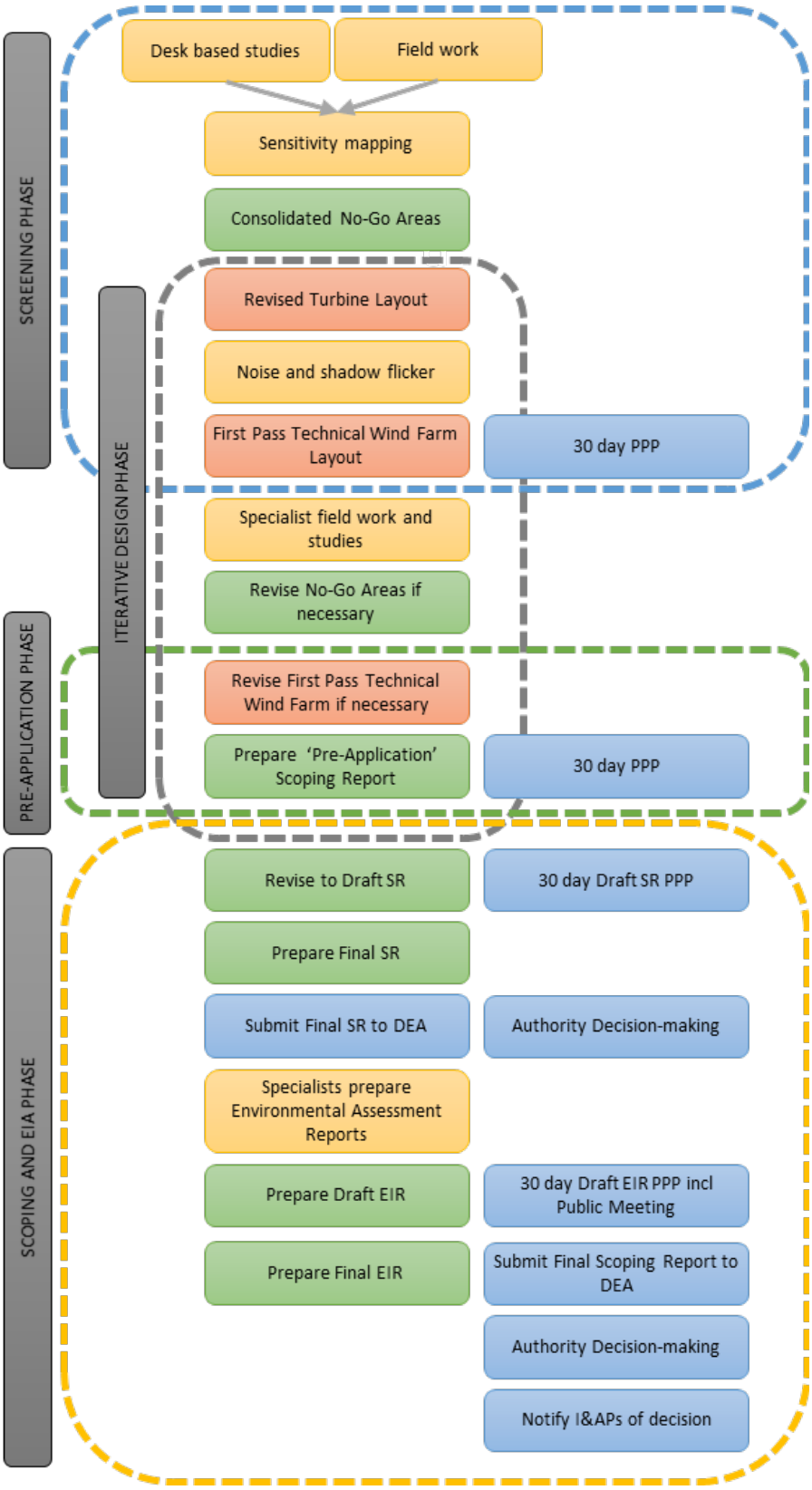

Figure 4.2: Environmental assessment process for the project

4.3 Pre-application Scoping Phase

The proposed site layout that was identified during the Screening and Iterative Design Phases was the basis for the Pre-Application Scoping Report. Figure 4.3 below shows where this phase occurs in relation to the official Scoping and EIA Process, and the respective timeframes.

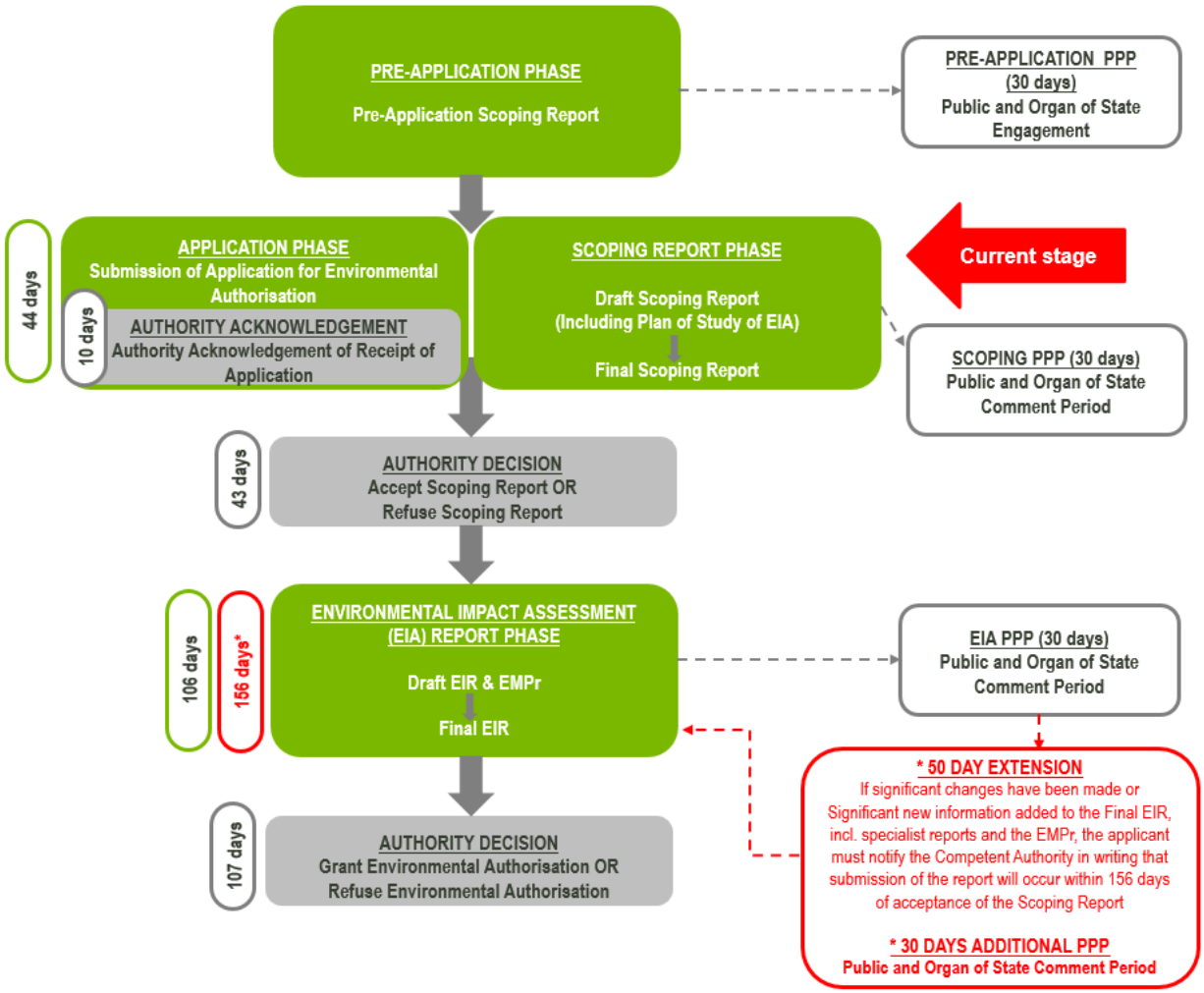

Figure 4.3: Scoping and EIA Process

4.3.1 Objectives of Scoping

Although the Pre-Application Scoping Phase is not considered to be within the official legislated process and timeframes, the exercise and reporting was undertaken to align with the requirements of the 2014 EIA Regulations, as amended. Only minor changes have therefore been made for this Draft Scoping Report .

The objective of the Scoping process, as set out in Appendix 2(1) of the 2014 EIA Regulations (GN R982 of 2014, as amended) is summarised as follows:

Objectives of the Scoping Phase:

- Identify the relevant policies and legislation;
- Motivate the need and desirability of the proposed activity;
- Identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all alternatives;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology, expertise and consultation to determine the impacts on the preferred site and to inform the location of the development footprint within the site; and
- Identify suitable mitigation measures.

4.3.2 Methodology

NEMA advocates that "*a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions*" and this has been the approach to the assessment of impacts in this report. Whilst this approach has been broadly adopted, it also applies specifically, where specialists have assessed a "worst-case" scenario regarding total number of turbine locations and turbine specifications.

In terms of number of turbines and energy generation potential, the consolidated Impofu Wind Farms site has been designed to have 129 turbine locations in total. The Impofu West Wind Farm has been designed to have 41 turbine locations, and the Impofu North and West Wind Farms to each have 47 and 41 turbine locations, respectively. An application for environmental authorisation is being made to the DEA for the 129 turbine locations through the submission of the Impofu West, North and East Wind Farm applications separately. The Proponent has committed to not develop more than 120 of the 129 turbine locations across the three wind farms collectively. Assessment of the full complement of 129 turbine locations in the respective Scoping and EIA processes is a precautionary approach because throughout the comprehensive approvals and design process for wind farms that continues after an environmental authorisation is granted, there is potential for any of the turbine locations to be dropped due to influences beyond the projects control. Thus, it is critical from a project risk perspective at the environmental authorisation stage to have spare turbine locations. The extra nine locations, over and above the 120 to be constructed, serve that purpose.

Following from the above, the assessment of 129 turbine locations along with an 'exacerbated rotor swept area envelope' (discussed in detail in Section 6.3.1 Project description) represents a greater potential impact scenario than can ever be constructed in reality for all three wind farms. However, due to the reasons given above, this is the scenario that all the specialists have assessed even though it over exaggerates the source of impacts that will eventually be constructed. For simplicity sake this over exaggerated impact scenario is termed the "worst-case" scenario in this document and in all specialists' reports.

To fulfil the NEMA requirements for Scoping, the EAP, along with the specialist team, undertook the following tasks, the outcome of which was documented in the Pre-Application Scoping Report:

4.3.2.1 Drafting of report

Specialist reporting including:

- Baseline description including details of field work;
- Assessment of impacts for all phases of the project, namely construction, operation and decommissioning phases, as well as direct and indirect impacts in accordance with a standard

methodology provided by Aurecon (Section 10) which considers the probability of each impact occurring, the reversibility of each impact and the level of confidence in each potential impact;
- The identification of any residual impacts before and after mitigation;
- Summary of potential mitigation measures;
- An assessment of the No-Go alternative;
- An assessment of cumulative impacts; and
- Documenting Plan of Study for the EIA Phase where further work is required.

During the Pre-Application Scoping Phase, specialists were requested to assess the impacts of the proposed site layout to meet the requirements of Appendix 6 (Contents of Specialist Reports) of GN R982 of 2014, as amended. It was intended that a detailed assessment at this stage would allow for a full interrogation of environmental impacts early on in the process as well as detailed mitigation measures that could be investigated iteratively. This ensured that where impacts could not be 'avoided' that there was mitigation available to 'minimise' or 'reduce' impacts to an acceptable level.

Although detailed specialist assessments were undertaken as part of the Pre-Application Phase, the Pre-Application Scoping Report was prepared to meet the requirements of Appendix 2 (Contents of Scoping Report) of GN R982 of 2014, as amended. The detail of these studies can be found in Appendix C and will be refined where necessary in the EIA Phase as set out in the Plan of Study for the EIA (Section 10).

EAP reporting including:

- Reporting on the PPP thus far;
- Review of relevant policies and legislation, as well as review of the need and desirability of the project;
- Description of baseline environment including information from specialist studies;
- Collation and assessment of key issues and impacts based on information from specialist studies;
- Provision of rationale for screening of alternatives;
- Identification of revisions to specialist studies required during the EIA Phase;
- Identification of a suitable public participation process (PPP) during the EIA Phase; and
- Preparation of a Pre-Application Scoping Report.

PPP including the following activity:

- 5-week public consultation on the Pre-Application Scoping Report (detailed in Section 4.6).

Following PPP, the Pre-Application Scoping Report was revised to this Draft Scoping Report based on the following:

4.3.2.2 Revision of report

Specialist reporting including:

- Updates due to PPP inputs received during the Pre-Application Scoping Phase; as well as any new fieldwork, if required. This is described further in Section 10 (Plan of Study for the EIA).

EAP reporting including:

- Updating of the Comments and Responses Table in the Public Participation Report;
- Updating of any baseline environment information and impacts assessment by specialists; and
- Preparation of a Draft Scoping Report.

4.4 Scoping Phase

Although Scoping activities were undertaken in preceding phases, the official Scoping Phase and circulation of the Draft Scoping Report for public comment is commencing simultaneously with the submission of the Application for environmental authorisation to DEA as indicated in Figure 4.3.

Following the official 30-day public comment period for the Scoping Phase, the EAP, along with the specialist team will undertake the following tasks related to updating of the report, the outcome of which will be documented in the Final Scoping Report:

Specialist reporting including:

- Updates based on new information and/or refinement of the site layout due to PPP inputs during the Draft Scoping Phase; as well as any new fieldwork, if required. This is described further in Section 10 (Plan of Study for the EIA).

EAP reporting including:

- Updating of the Comments and Responses Table in the Public Participation Report;
- Updating of any baseline environment information and impacts assessment by specialists; and
- Preparation of a Final Scoping Report.

As stipulated in Regulation 22 of the 2014 EIA Regulations (GN R982, as amended), the Final Scoping Report will be submitted to DEA for review within the legislated 44 days after the receipt of the Application Form. Thereafter DEA must, within 43 days of receipt of the Final Scoping Report, consider it, and in writing –

DEA response to the Final Scoping Report:

(a) Accept the report and advise the EAP to proceed with the tasks contemplated in the Plan of Study for EIA; or

(b) Refuse environmental authorisation if;

(i) The proposed activity is in conflict with a prohibition contained in legislation; or

(ii) If the Scoping Report does not substantially comply with the objectives and content requirements for scoping reports in terms of the 2014 EIA Regulations and the applicant cannot ensure compliance with these regulations within the prescribed timeframe.

4.5 EIA Phase

If the Scoping Report is accepted, the Scoping Phase will be followed by the EIA Phase, which will comprise an Environmental Impact Report (EIR) and Environmental Management Programme (EMPr) that will be informed by the Plan of Study for the EIA approved by DEA. This phase will culminate in a 30-day public comment period on the EIR and EMPr. The proposed Plan of Study for this Phase is detailed in Section 10 (Plan of study for the EIA).

4.6 Public Participation Process (PPP)

4.6.1 Definition of PPP

Section 1 of NEMA defines public participation in the context of environmental authorisation as follows:

"Public participation process" … *means a process by which potential interested and affected parties are given opportunity to comment on, or raise issues relevant to, the application ensure compliance with these regulations within the prescribed timeframe*.

To substantiate, DEA's Public Participation Guidelines (2012:5) introduce public participation as follows:

"*Public participation is one of the most important aspects of the environmental authorisation process… This is because people have a right to be informed about potential decisions that may affect them and that they must be afforded an opportunity to influence those decisions. Effective public participation also facilitates informed decision-making by the competent authority and may result in better decisions as the views of all parties are considered*".

Public participation is an iterative two-way process between the Proponent and the EAP, and the I&APs, whether these be individuals, organisations, or organs of state.

4.6.2 Key stakeholders

One of the first tasks undertaken during the environmental assessment process was to identify the key stakeholders as stipulated by the 2014 EIA Regulations, as amended. These include, *inter alia*, the following key groups:

- Landowners and adjacent landowners;
- Occupants;
- Relevant district and local municipalities, including ward councillors;
- Relevant national and provincial government departments;
- Relevant national and provincial parastatals and organisations;
- Key stakeholders in renewable energy projects in the area;
- Conservation groups; and
- Other organisations in the area.

4.6.3 Scope of the Public Participation Process

A Public Participation Report has been included in Appendix B and provides detail on the process that has been followed to date, as well as proof of PPP activities. This document will be updated as the project progresses. Table 4.1 summarises the PPP to date and the proposed activities going forward.

Table 4.1: Scope of Public Participation

Task	Date
Screening and Iterative Design Phase	
Pre-Application consultation with DEA	17 October 2017
Multi day Screening site visit by EAP and specialists	10 – 15 September 2017
Identification of initial stakeholders and circulation of background information document (BID) and Screening PPP including: • Written notification • Site notices • Newspaper adverts • Website	December 2017 – Mach 2018
Focus group meetings: • Authorities • Key stakeholders • Landowners	6 – 8 February 2018
Pre-Application Scoping Phase	
5-week PPP on Pre-Application Scoping Report including: • Written notification • Site notice updates • Newspaper adverts • Website • Libraries	1 August – 7 September 2018
Open house/ public meetings • St Francis Bowling Club • Thornhill Hotel	 21 August 2018 22 August 2018

Task	Date
• Innibos Lapa	23 August 2018
Pre-Application consultation with DEA	11 September 2018
Scoping Phase	
30-day PPP on Draft Scoping Report including: • Written notification • Website • Libraries	11 October – 9 November 2018
EIA Phase	
30-day PPP on Draft Environmental Impact Report (EIR) including: • Written notification • Site notice updates • Newspaper adverts • Website • Libraries	March 2019
Public meetings	March 2019

4.6.4 Summary of the issues raised by I&APs

The issues that have been raised by I&APs to date are summarised below, more details are provided in Appendix B (Public Participation Report) which also describes the manner in which they have been addressed.

- Concerns were raised regarding the increase in the cumulative impact of mortality of bird and bat species by the proposed Impofu Wind Farms given the baseline impact already includes the mortalities from the existing wind farms in the area. Specific concern was raised on the robustness of the cumulative assessment on the pre-construction studies for birds and bats;
- An investigation of alternative technologies such as vortex turbines, and constructing offshore wind farms should be considered;
- A number of queries centred around job creation from the proposed wind farm;
- Concern was highlighted on the possible impact on the existing road network;
- The area is known for its high potential agricultural land, and the anticipated impacts on agriculture;
- Concern was raised with regards to biosecurity and the threat of animals moving between farm properties;
- General support for wind energy as an alternative to other energy sources such as nuclear;
- St Francis Bay birding group and individuals concerned about impacts to birds and bats, specifically requesting more information on:
  - migration paths,
  - innovative mitigation measures, and
  - the cumulative impacts associated with existing wind farms - “mega wind farm”
- Positive feedback on the approach undertaken to avoid sensitive areas in layout;
- Queries with regards to construction process, when, will all three wind farms be built simultaneously, and where would construction staff live. What opportunities are there for local SMMEs and how can they be ready;
- Request to assess impacts on roads and existing infrastructure, given damage to roads caused by previous wind farms; and
- How will the beneficiaries of the local spending be chosen.

4.7 Assumptions, limitations and gaps in knowledge

In undertaking this investigation and compiling the Scoping Report, the following assumptions and limitations have been identified:

1. The information provided by the Proponent is accurate and unbiased, and no information that could change the outcome of the EIA process has been withheld.
2. The strategic level investigations and feasibility studies undertaken by the client and project engineers prior to the commencement of the EIA process are technically acceptable and robust.
3. This report is based on the most available information to date, both in terms of project description and specialist findings.
4. The scope of this investigation is limited to assessing the environmental and social impacts associated with the proposed Impofu West Wind Farm and associated infrastructure, and it is assumed that other relevant authorisations and permits for the proposed development would be managed as part of a separate application.
5. The information provided by the specialists is accurate and unbiased.
6. Various methods and sources were used to identify the potential social and environmental aspects associated with the proposed project and used to develop the Terms of References (ToRs) for the specialist studies. These include, *inter alia*, the following:
    a. Collection of information specific to the project, as provided by the Proponent, such as project description; construction, operation and decommissioning methodologies, project timeframes and technical information relating to design.
    b. Other relevant BARs/ EIRs prepared for BAs/EIAs undertaken in the area (as referenced in Section 11);
    c. Environmental baseline literature and targeted aerial surveys for this site (including LiDAR and aerial imagery);
    d. Environmental baseline surveys for this site and surrounding areas from site visits undertaken by the respective specialists;
    e. Monitoring of environmental aspects such as 12 month bird and bat activity monitoring on the site as well as information from monitoring of bird and bat activities and fatalities on adjacent wind farm sites;
    f. Consultation with the project team (including specialists); and
    g. Consultation with I&APs, including authorities.
7. As already mentioned in Section 4.3, during the Pre-Application Scoping Phase, specialists were requested to assess the impacts of the proposed site layout to meet the requirements of Appendix 6 (Contents of Specialist Reports) of GN R982 of 2014, as amended. It was intended that a detailed assessment would allow for a full interrogation of environmental impacts early on in the process as well as detailed mitigation measures that could be investigated iteratively. This ensured that where impacts could not be 'avoided' that there was mitigation available to 'minimise' or 'reduce' impacts to an acceptable level. Although these detailed specialist assessments were undertaken as part of the Pre-Application Phase, this Draft Scoping Report has been prepared to meet the requirements of Appendix 2 (Contents of Scoping Report) of GN R982 of 2014, as amended. The detail of these studies can be found in Appendix C and will be refined where necessary in the EIA Phase as set out in the Plan of Study for the EIA (Section 10).
8. This Draft Scoping Report has been revised based on more up to date information that has arisen during the Pre-Application Phase. Specifically the bird and bat studies have been updated in response to ongoing monitoring and comments received from I&APs during the Pre-Application Phase. As a result, the bat specialist has updated the sensitivity mapping for the site area, and the revised mapping is contained in the updated bat specialist report. Therefore it is evident that the turbine locations and

associated infrastructure layout requires further refinements which will be undertaken at the EIA Phase. This is to specifically avoid bat high sensitivity areas that are continually being updated as the 12 month bat pre-construction monitoring study, which is currently being undertaken, progresses. The bird specialist updated his report to exclude the assessment of the 132 kV overhead collector powerline as this is being assessed in the separate Grid Connection Basic Assessment process. He also updated information with regard to bird migration routes and blue cranes.

9. The turbine specifications are not confirmed at this stage and hence the total MW of energy to be generated is not yet confirmed. To deal with this limitation, an 'exacerbated rotor swept area envelope' termed a 'worst-case' scenario has been assessed in relation to turbine specifications and this is detailed in Section 6 (Project description). Similarly, a maximum amount of MW is being presented for authorisation.
10. Any limitations and gaps in knowledge that have been encountered by the specialists are identified in their respective assessments (Appendix C).

5 Alternatives rationale

5.1 Introduction

The NEMA requires that alternatives are considered during the EIA/ BA process. An alternative can be defined as a possible course of action, in place of another, that would meet the same purpose and need (DEAT, 2004).

The 2014 EIA Regulations (GN R982), as amended, provide the following definition: *"alternatives", in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to the -*

a) *property on which or location where the activity is proposed to be undertaken;*
b) *type of activity to be undertaken;*
c) *design or layout of the activity;*
d) *technology to be used in the activity;*
e) *operational aspects of the activity; and*

includes the option of not implementing the activity" ("No-Go" alternative).

However, Appendix 2 (Contents of Scoping Report) of GN R982 of 2014, as amended, (2)(1)(g)(x), states that '*if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such*' should be provided in the Scoping Report and described in full.

Alternatives have been screened out of the Scoping Phase through a detailed screening process. The section below provides a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site to motivate for this.

5.2 Location alternatives

The area proposed for the Impofu Wind Farms lies on a section of coastal plain between Cape St Francis and Oyster Bay, and is therefore exposed to consistent winds from the ocean from the south-west and south-east. This results in excellent wind conditions and low levels of turbulence, making it one of the best wind resources in the country and ideal for a wind farm development. This great wind resource drops off very quickly to the east and west and inland and is much lower to the east of Jeffreys Bay and to the west of the Tsitsikamma Community Wind Farm. Thus, the Impofu Wind Farms site is located on the remaining land where the best wind resource is located. The site is also mainly transformed flat farmland and has easy access.

For this reason, Red Cap developed the Gibson Bay and Kouga Wind Farms in this area. When Red Cap planned to develop additional wind farms, they looked to other possible areas within the country before returning to this area in the Eastern Cape.

Other attractive sites in the Eastern Cape were discarded during initial screening exercises due to the presence of Cape Vulture roosts adjacent to the sites. Potential sites in the Western Cape and Northern Cape were discarded due to issues with the Square Kilometre Array (SKA) telescope and lack of grid connection possibilities.

Therefore, alternative locations have been screened out for the purposes of the EIA.

5.3 Site layout design

To establish the most feasible site layout for the Impofu West Wind Farm, a detailed screening process was undertaken for the consolidated site by Red Cap and a multi-disciplinary team. The purpose of this process and the outcomes are described in detail in the sections below.

5.3.1 Introduction and purpose of screening

Screening is undertaken at the pre-feasibility stage to allow environmental and social impacts to be considered early on in the project lifecycle and evaluated in an integrated manner with the engineering design considerations. Designs based on screening input are therefore sensitive to environmental and socio-economic constraints, reducing projects risks as a whole and supporting the application of the mitigation hierarchy (as advocated in the principles of the NEMA, section 2), in the form of avoidance and minimisation of impacts. By adopting this precautionary approach, it ensures that more accurate, detailed and robust information is available to all stakeholders (Proponent, engineers, specialists, authorities, I&AP's etc.) early on in the process and thus that they all have more time to engage with it in a far more informed manner. Therefore, it is more likely that once a project is subject to the detailed and time restricted legislated EIA process, potential significant impacts have already been identified and avoided (where possible) which reduces the likelihood of significant issues needing to be dealt with during the legislated EIA process. This allows for more confidence in the project with a greatly reduced risk for the environment. This precautionary approach leads to a far more robust assessment which allows for the DEA to make a more informed decision.

The detailed screening process for the Impofu Wind Farms was specifically based on identification and mapping of No-Go areas of the site in order to avoid all environmental, socio-economic and technical sensitive areas, and considered both impacts from turbines and other infrastructure (internal overhead power lines, roads, and underground cables and buildings) as separate No-Go layers. This allowed all suitable areas for turbine locations, and associated infrastructure within the site to be identified and modelled, which would then be geographically split into three separate potential wind farm sites and layouts, one of which would be the Impofu West Wind Farm. These layouts would be the basis for the wind farms that would be taken forward for environmental assessment.

Through the application of environmental sensitivities and associated developmental No-Go areas that should be avoided by a developer, the screening assessment allows the environmentally favourable alternative to be identified, in the form of an environmentally preferred site layout. It can also guide selection of mitigation measures in certain areas. Thus, the outcome of the screening process is the most feasible and reasonable alternative (also known as the preferred alternative) to be considered for detailed assessment in the EIA process.

It is the intention that the detailed description of the screening process presented in this section provides the motivation for not considering alternatives in the environmental assessment process as it documents the process through which environmental sensitivities were avoided at an early stage in the project lifecycle. Through this process the most environmentally and socio-economically favourable site layout was thus identified for assessment in this environmental assessment process. The screening process in the context of the environmental assessment process is shown in Figure 4.2.

5.3.2 Screening approach

The screening process was led by Aurecon, relying on inputs from the various environmental specialists, as well as Red Cap, as the developer, and their appointed engineers regarding the technical requirements for the proposed wind farms.

Screening was based on an interactive team approach allowing for active participation in the layout selection process.

The following team was involved in the screening process (Table 5.1):

Table 5.1: Team of environmental and technical specialists

Discipline	Company	Specialist
Terrestrial ecology	3Foxes Biodiversity Solutions (Pty) Ltd	Simon Todd
Aquatic ecology	Scherman, Colloty and Associates	Dr Brian Colloty
Bats	Animalia consultants	Werner Marais
Avifauna	Wildskies ecological services	Jon Smallie
Agriculture	Independent consultant	Johann Lanz
Socio-economic	Urban-Econ Development Economists	Matthew Keeley and Thomas Parsons
Palaeontology	Natura Viva	Dr John Almond
Archaeology	Independent consultant	Dr Peter Nilssen
Noise and shadow flicker	3E	Astrid Peeters and Lien Van Breusegem
Visual	Quinton Lawson, Architect and Bernard Oberholzer, Landscape Architect	Quinton Lawson and Bernard Oberholzer
Grid	Thabile	Jurie Kriel
Wind farm – roads	Ekcon	Erik Raimond
Wind farm – turbine layout	Africoast	Gerald Ehlers
Wind farm – cable layout	Red Cap	Monique le Roux
Technical	Red Cap	Lance Blaine
Technical	Red Cap	Jadon Schmidt
Technical	Red Cap	Simon Daniel
Environmental	Aurecon	Claire Blanché
Environmental	Aurecon	Diane Erasmus
Environmental	Aurecon	Kim White
Environmental	Aurecon	Kirsten Jones
Environmental	Aurecon	Mieke Barry
Environmental	Aurecon	Zoë Palmer

The approach to the screening process was as follows:

1. Specialists undertook a desk based study including engaging with the project information provided by Red Cap and documenting the environmental baseline of the site.
2. Specialists and EAP undertook a desk based study and high-level review of other adjacent projects identified in the area.
3. Specialists identified No-Go, highly sensitive, moderately sensitive and low sensitivity developable areas, for both the turbine layout, and the other associated infrastructure (internal overhead power lines, roads, underground cables and buildings).
4. A one week multi-disciplinary site visit was held. During this week the site visits and additional field work were undertaken where necessary. In addition, a multi-disciplinary screening workshop was held with all the relevant specialists[5] which involved the following:
    a. Each specialist reported on their desk based findings of the site, which had been groundtruthed in the prior site visit. In the case of the bird fieldwork, pre-construction monitoring had already commenced prior to the workshop and was also considered.
    b. Specialists also reported on the criteria that they used to identify and establish their specialist specific No-Go areas and the highly sensitive, moderately sensitive and low sensitivity developable areas. No-Go criteria are listed in Table 5.2.
    c. Planning / existing infrastructure No-Go areas were also considered as originally identified by Red Cap and include planning constraints. These are listed in Table 5.2 as well.
    d. The synergies and overlaps between the specialists' spatially sensitive areas were identified. Examples include centre pivots which are agricultural No-Go areas due to their productivity but are also No-Go areas for bats as they attract insects on which bats feed. In this case, there was collaboration and a unified layer was used. Similarly, watercourses (wetlands, rivers and dams) are sensitive ecosystems in their own right, but also provide habitat for bats and certain species of bird. For consistency in this case, the latest aquatic ecosystem layer was provided by the aquatic specialist, to which the bat and bird specialists added their preferred buffer. Another example is the planning / existing infrastructure No-Go area which was 500 m from the N2, which also corresponds with the visual buffer for national roads.
    e. Input was provided by the wind farm engineer to describe the site with regards to wind regime and which parts of the site were most suitable for turbine locations, as well as explaining how the generation capacity of the turbines is affected by wake effect and turbulence.
5. Following the workshop, specialists provided spatial datasets showing highly sensitive, moderately sensitive and low sensitivity developable areas, for both the turbine layout, and the other associated infrastructure (internal overhead power lines, roads, underground cables and buildings). A set of sensitivity maps was created for each specialist discipline, for each type of infrastructure (note in some cases, the same sensitivity layer was applicable to more than one type of infrastructure).
6. The No-Go dataset for each specialist was then extracted and collated to inform a set of Consolidated No-Go Maps for the four types of infrastructure. Table 5.2 sets out what each specialist considered to be included in the No-Go layer.
7. The initial developer's turbine layout (as depicted in Figure 5.1) provided at the outset of the project was revised by the project engineers based on the Consolidated No-Go Maps and arranged into three potential wind farms. The optimal turbine layout aimed to maximise the energy outputs after taking account of the No-Go layers and therefore took into account wake effect as well as elevation.
8. Noise and shadow flicker modelling and bird monitoring were undertaken to further refine the layout.

[5] Some of the specialists were not present (socio-economic, palaeontology, noise and shadow flicker) as their inputs were not as crucial at this stage in the process, the visual specialist was also not present, however these specialists provided input prior to and during the process.

9. The significant discovery of a Martial Eagle nest along the banks of the Impofu Dam had implications for the wind farm design due to the developer implementing the avifaunal specialist's recommendation to include a 6 km radial buffer as a No-Go area for turbines. The specialist also recommended that a 1.5 km No-Go buffer area around the nest was applicable for the internal overhead power line lines, roads and underground cables and buildings. The avifauna sensitivity maps were updated on this basis, as was the Consolidated No-Go Maps, which were then submitted to the engineers for further layout refinement.

Table 5.2: Sensitivity classifications applicable to the consolidated site

Discipline	No-Go criteria				Notes
	Turbines	Internal overhead power lines	Roads and underground cables	Buildings	
Planning / Existing Infrastructure	• External boundary with 225 m buffer • Internal boundary with 75 m buffer • Turbines on adjacent wind farms with 1,000 m buffer • N2 with 500 m buffer • Public roads with 100 m buffer • Structures with 500 m buffer • Telkom corridor with 540 m buffer • Tsitsikamma Community Wind Farm 132 kV overhead power line with 180 m buffer • Gibson Bay Wind Farm 132 kV overhead power line with 180 m buffer	• N2 with 100 m buffer • Public roads with 30 m buffer (where they run parallel to the road, but they can cross these roads as long as it is at an angle ideally between 45 and 90 degrees and complies with the relevant road authorities' requirements and approval).	None	• Farm boundary with 30 m buffer • Public roads with 30 m buffer	Dams and agricultural centre pivots with appropriate buffers are also considered to be a No-Go area however are not included here due to overlap with the specialist No-Go areas.
Terrestrial ecology	• Critical and unique habitats that serve as habitat for rare / endangered species or perform critical ecological roles. For example, the intact dune areas in the south of the site, certain drainage systems and intact fragments.	• Same as turbine sensitivity criteria.	Same as turbine sensitivity criteria.	• Same as turbine sensitivity criteria.	**Overhead power lines**: No-Go areas apply specifically to the pylon footprint. An exception to the No-Go areas when an existing overhead powerline bisects a No-Go area; here these can be used for overhead power lines (with any rehabilitation / monitoring conditions proposed by the specialist). **Roads and underground cables:** The only exception being that when an existing road/ farm track bisects a No-Go area; here

Discipline	No-Go criteria				Notes
	Turbines	Internal overhead power lines	Roads and underground cables	Buildings	
					these areas can be used for roads and underground cables (with any rehabilitation / monitoring conditions proposed by the specialist).
Aquatic ecology, including geohydrology	• Impofu Dam with 50 m buffer • Other dams with 20 m buffer • All wetlands require a minimum of 50 m buffer unless identified as higher by the bird and bat specialists • Artificial dams • Watercourses with 32 m buffer	• Impofu Dam with 50 m buffer • Other dams with 20 m buffer • All wetlands require a minimum of 50 m buffer unless identified as higher by the bird and bat specialists.	Same as internal overhead power lines sensitivity criteria.	Same as turbine sensitivity criteria.	**Internal overhead power lines:** No-Go areas apply specifically to the pylon footings. **Roads and underground cables:** The only exception when an existing road/ farm track bisects a No-Go area; here these areas can be used for roads and underground cables (with any rehabilitation / monitoring conditions proposed by the specialist).
Birds	• Martial eagle nest with a 6 km buffer • Impofu Dam with 600 m buffer • Dams > 1 ha and within priority blue crane areas with a 250 m buffer • High sensitivity wetlands with a 100 m buffer • Mini gorges with a 250 m buffer	• Martial eagle nest with a 1.5 km buffer • Impofu Dam with 600 m buffer • Dams > 1 ha and within priority blue crane areas with a 250 m buffer • High sensitivity wetlands with a 100 m buffer • Mini gorges with a 250 m buffer	• Martial eagle nest with a 1.5 km buffer • High sensitivity wetlands • Mini gorges	Same as roads and underground cables sensitivity criteria.	**Roads and underground cables:** The only exception when an existing road/ farm track bisects a No-Go area; here these areas can be used for roads and underground cables (with any rehabilitation / monitoring conditions proposed by the specialist). **Internal overhead power lines:** Power lines allowed in Bird No-Go areas in specific cases agreed by the specialist.
Bats	• Centre pivots with 200 m buffer • Impofu Dam with 600 m buffer	N/A	N/A	N/A	**Turbines:** Buffers for turbines are for the base footprint specifically and exclude the swept areas.

Discipline	No-Go criteria				Notes
	Turbines	Internal overhead power lines	Roads and underground cables	Buildings	
	• Klipdrift Dam with 500 m buffer • Tsitsikamma River with 800 m buffer • Drainage lines, other water bodies and other sensitivities with 200 m buffer • Coastal edge with 500 m buffer *No-Go areas are those that are deemed critical for resident bat populations, capable of elevated levels of bat activity and support greater bat diversity/activity than the rest of the site. These areas are 'No-Go' zones and turbines may not be placed in these areas and their buffers.				Features used to develop the sensitivity map: • Manmade structures, such as buildings, houses, barns and sheds. These structures provide easily accessible roosting sites. • Centre pivots are regularly irrigated and visited by livestock, this attracts insects and therefore insectivorous bats. • The different vegetation types and landform. Valleys and slopes can offer airspace sheltered from wind for insect prey and subsequently attract insectivorous bats. Larger woody shrubs or small trees can offer similar sheltered airspace or offer some roosting spaces. Open water sources, be it man-made farm dams or seasonal natural areas. They are important sources of drinking water and provide habitat that host insect prey.
Agriculture	• Centre pivot irrigation lands	Same as turbine sensitivity criteria.	Same as turbine sensitivity criteria.	Same as turbine sensitivity criteria.	Overhead power lines can cross centre pivot areas, but there are implications for the line height. There is a minimum distance requirement between the lines and the irrigation equipment, in order to prevent discharge. This

Discipline	No-Go criteria				Notes
	Turbines	Internal overhead power lines	Roads and underground cables	Buildings	
					means that the lines must be constructed higher than normal over a centre pivot area, which increases the costs associated with line construction. **Roads and underground cables**: An exception to the No-Go areas where an existing road / farm tract bisects any No-Go areas, and with the approval of the landowner.
Socio-economic / tourism	N/A	N/A	N/A	N/A	Sensitivities relate to land uses that have economic value such as agriculture.
Archaeology and Palaeontology	Archaeology: • SW corner – excluded due to proximity to Geelhoutboom dune area and associated cultural landscape. • SE corner - 'undisturbed' dune areas covered by coastal fynbos vegetation to be avoided as there is a higher possibility that *in situ* archaeological sites/materials will be encountered and possibly damaged/destroyed. • A medium density scatter of Stone Age stone artefacts in the NW corner of the site. • An isolated grave north of the N2.	Same as turbine sensitivity criteria.	Same as turbine sensitivity criteria.	Same as turbine sensitivity criteria.	

Discipline	No-Go criteria				Notes
	Turbines	Internal overhead power lines	Roads and underground cables	Buildings	
	<u>Palaeontology:</u> Single recorded site with an important marine trace fossil assemblage exposed in a hard rock quarry and related rock rubble excavated from the Peninsula Formation at a farm dam due west of Rosenhof farmstead (Lange Fontein 717/1) (Almond 2012).				
Noise and shadow flicker	N/A	N/A	N/A	N/A	The planning layer for turbines included the following to *inter alia* avoid noise and shadow flicker impacts: • Structures with 500 m buffer Noise and shadow flicker were modelled after the application of No-Go areas and siting of turbines.
Visual	• Landscapes of national scenic value • Water features of national scenic value • 1 km coastal zone • Cultural landscapes of national significance • Nature / Biosphere Reserves - within 2 km • Private reserves / game farms - within 1 km • Settlements / towns - within 1 km	N/A	N/A	N/A	

Discipline	No-Go criteria				Notes
	Turbines	Internal overhead power lines	Roads and underground cables	Buildings	
	• Farmsteads / residences - within 500 m • Scenic routes - within 1 km • National route N2 - within 500 m				

5.3.3 Iterative design process

The following steps detail how the screening process led into the iterative design process with the project engineers:

1. Following the revision of the No-Go mapping to include for the Martial Eagle, the turbine locations were re-modelled and the Impofu East substations and associated collector line was re-located to accommodate this new layout. Refer to Figure 5.2, Figure 5.3, Figure 5.4, and Figure 5.5 which show the maps incorporating the Martial Eagle finding. Note that these maps show all three proposed wind farms so as to contextualise the Impofu West Wind Farm with regards to the other proposed Impofu Wind Farms. The Impofu West Wind Farm is demarcated by the yellow outline, to clearly indicate the No-Go areas and infrastructure layout relevant to the Impofu West Wind Farm which is the basis of this Scoping Report.
2. Once the turbine locations had a level of certainty, desk based comment from specialists was sought and taken into account by making more further adjustments to the layout.
3. The roads and underground cables were then designed to avoid the identified Consolidated No-Go areas. Where possible, existing roads were used but due to blade lengths of approximately 75 m, the turning circles need to be adequate, and the roads would also need to be of a certain gradient. From a technical perspective, lengths of cable were considered too as electrical losses are incurred with distance.
4. Thereafter, the turbine locations were pegged and a groundtruthing process involving micro-siting of the turbines was undertaken with specific specialists, namely terrestrial ecology, aquatic ecology and archaeology. At this point one of the turbines was dropped from Impofu East as it was in an undulating vegetated small dune landscape with the risk of archaeological issues. A further turbine was added to Impofu North as a suitable gap in the No-Go layer was identified which had been missed and this location could be easily connected to another proposed turbine nearby, making it more viable.
5. At the same time, the terrestrial ecology, aquatic ecology and archaeology specialists groundtruthed any areas of concern in relation to the proposed roads and cables which informed the micro-siting. Existing roads that required upgrading were also identified and considered by the specialists (e.g. the Brakkeduine District Road for Impofu East and the District Road 1774 river crossings for Impofu West outside the site). At this point it was also identified where short sections of overhead powerlines may be required to avoid No-Go areas for roads and cables e.g. wetlands. This process was undertaken in consultation with the relevant specialists, especially avifaunal. The roads and cables design, and the overhead power line design was then finalised for the purposes of a design freeze for the Pre-Application Specialist Assessments as the basis of this report.
6. The buildings No-Go layer will be used to site any permanent buildings and temporary construction yards.

Table 5.2 shows what each specialist considered as being classified as a No-Go area. The Consolidated No-Go Areas for the various infrastructure types are depicted on Figure 5.2, Figure 5.3, Figure 5.4 and Figure 5.5.

In summary, the layout for the respective infrastructure components was therefore initially informed by the specialist sensitivity mapping and designed by the engineers iteratively with ongoing and detailed specialist and landowner input throughout the design process, which included groundtruthing where necessary. It must be noted that continually throughout this process there was interaction with the landowners and adjustments to the layout to ensure the impact on their farming operations from the proposed layout was negligible or positive where possible, in the case of new or upgraded roads.

The iterative screening process for the wind farm turbine locations commenced with 208 turbine locations, which was reduced to 172 locations after the multi-disciplinary screening workshop, and reduced further to 130 locations after the discovery of the Martial Eagle. The final number following this process is 129 turbine locations based on micro-siting and the removal of only one site due to archaeological sensitivities (with the intention to avoid unnecessary impacts to areas identified as sensitive by the Gamtkwa Khoisan Council) and these are

shown on Figure 5.2. The detailed methodology adopted has allowed for a robust screening of the consolidated Impofu Wind Farm site, so that the preferred approach to mitigation, being avoidance, could be implemented. This has allowed for identification of the ‘best practical environmental option’ for the site layout design of all three Impofu Wind Farm projects.

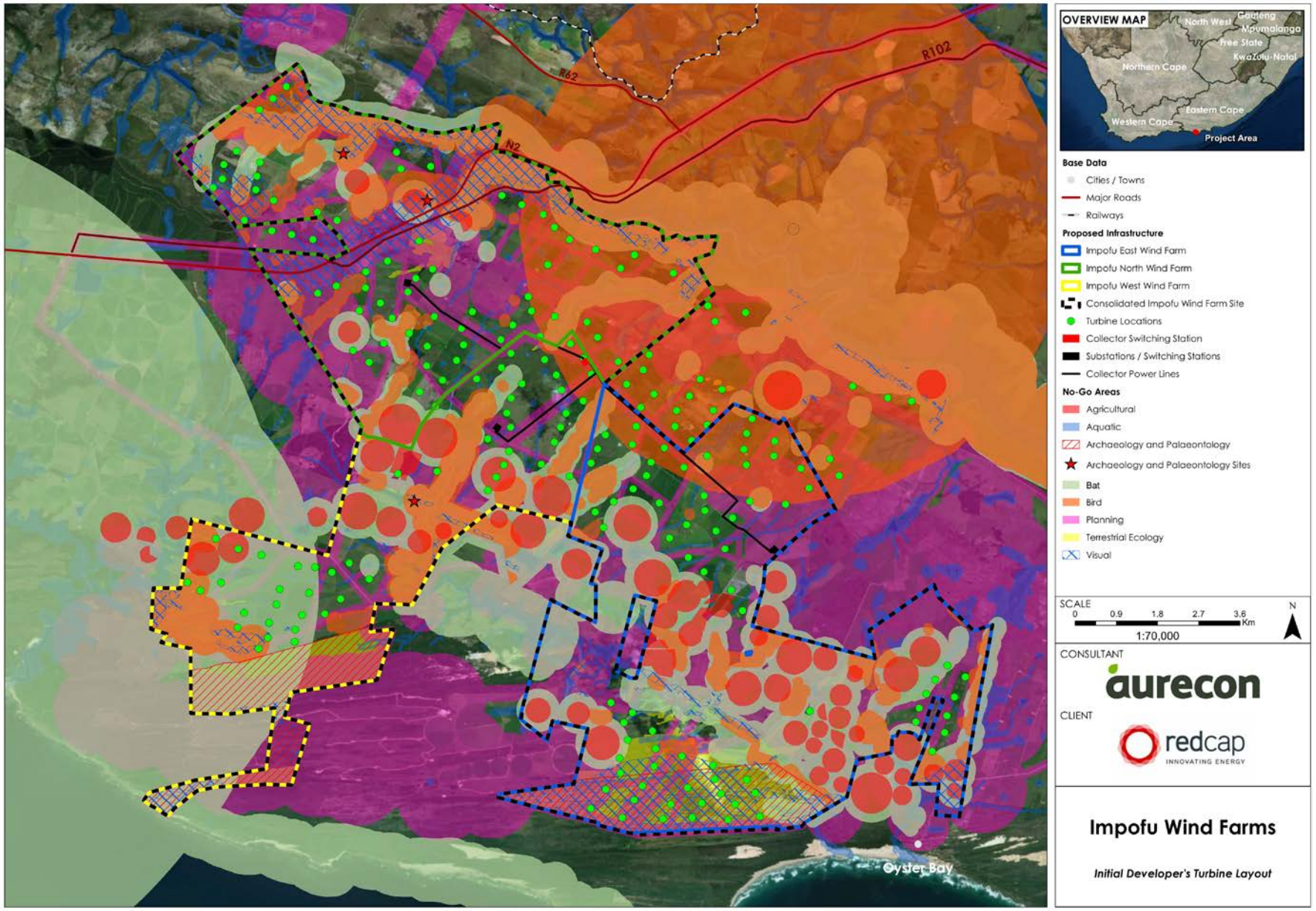

Figure 5.1: Planning and environmental consolidated No-Go areas showing initial developer's turbine layout (Impofu West Wind Farm outlined in yellow)

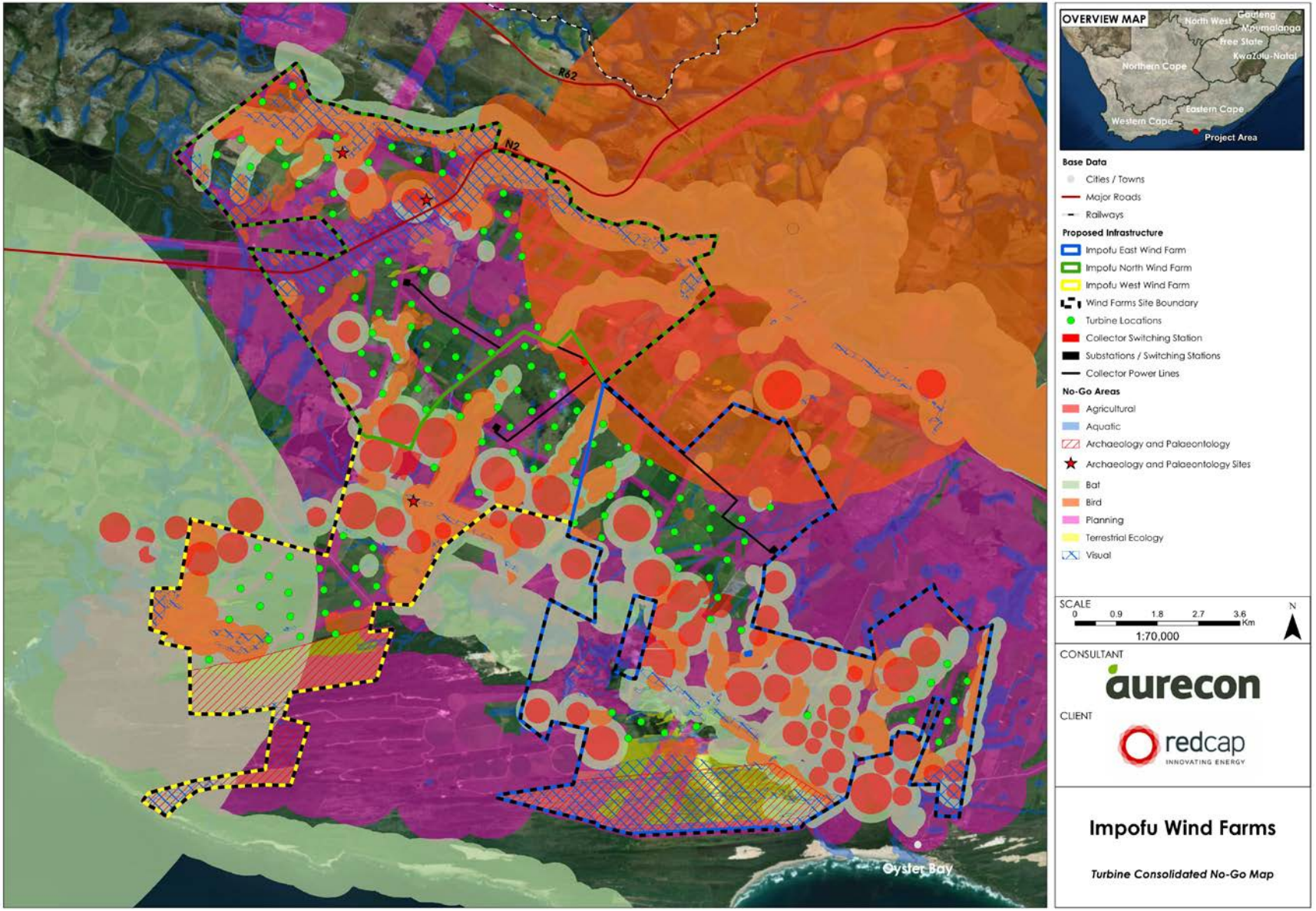

Figure 5.2: Planning and environmental consolidated No-Go areas for proposed turbines showing the proposed turbine locations (Impofu West Wind Farm outlined in yellow)

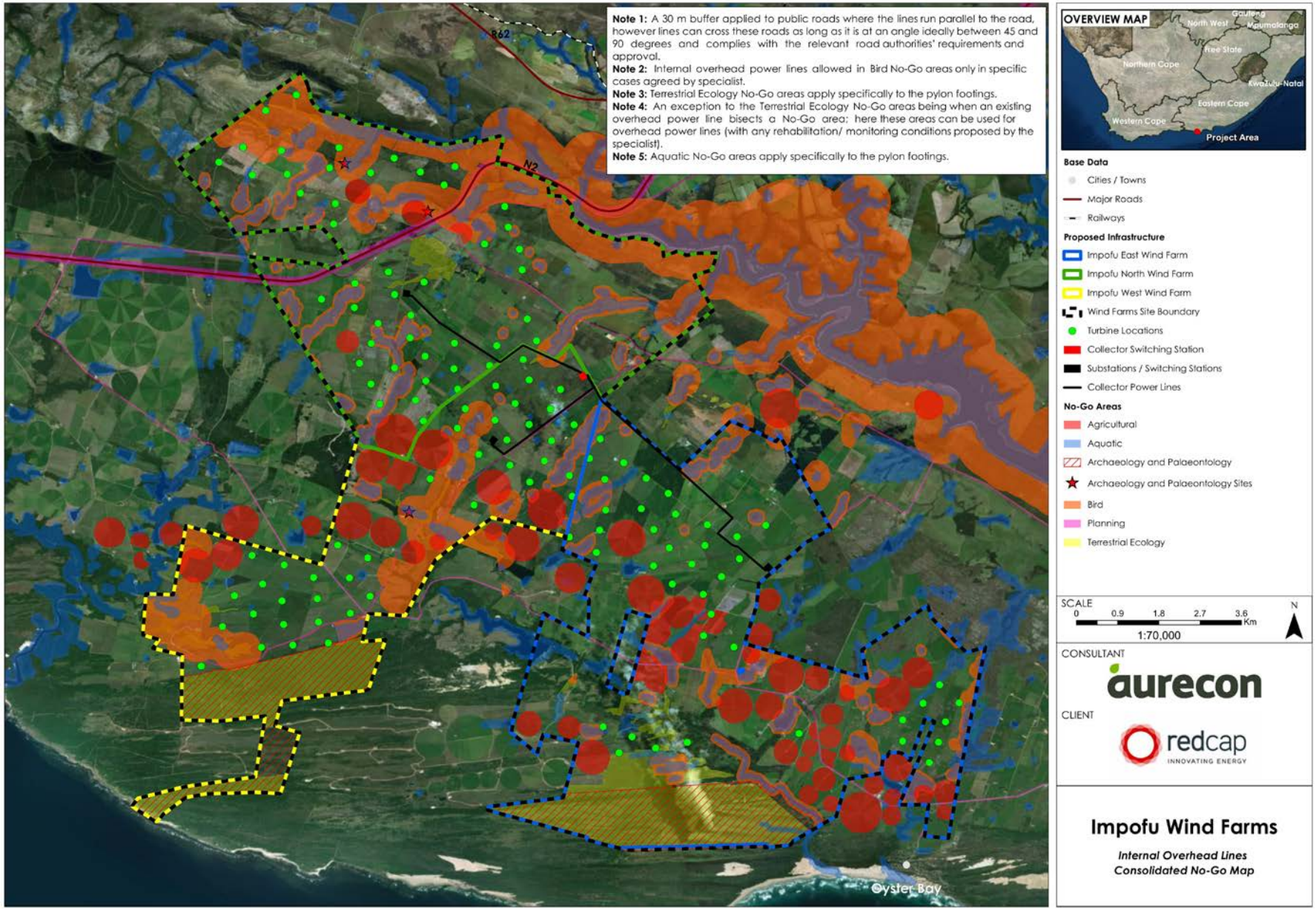

Figure 5.3: Planning and environmental consolidated No-Go areas for internal overhead power lines (Impofu West Wind Farm outlined in yellow)

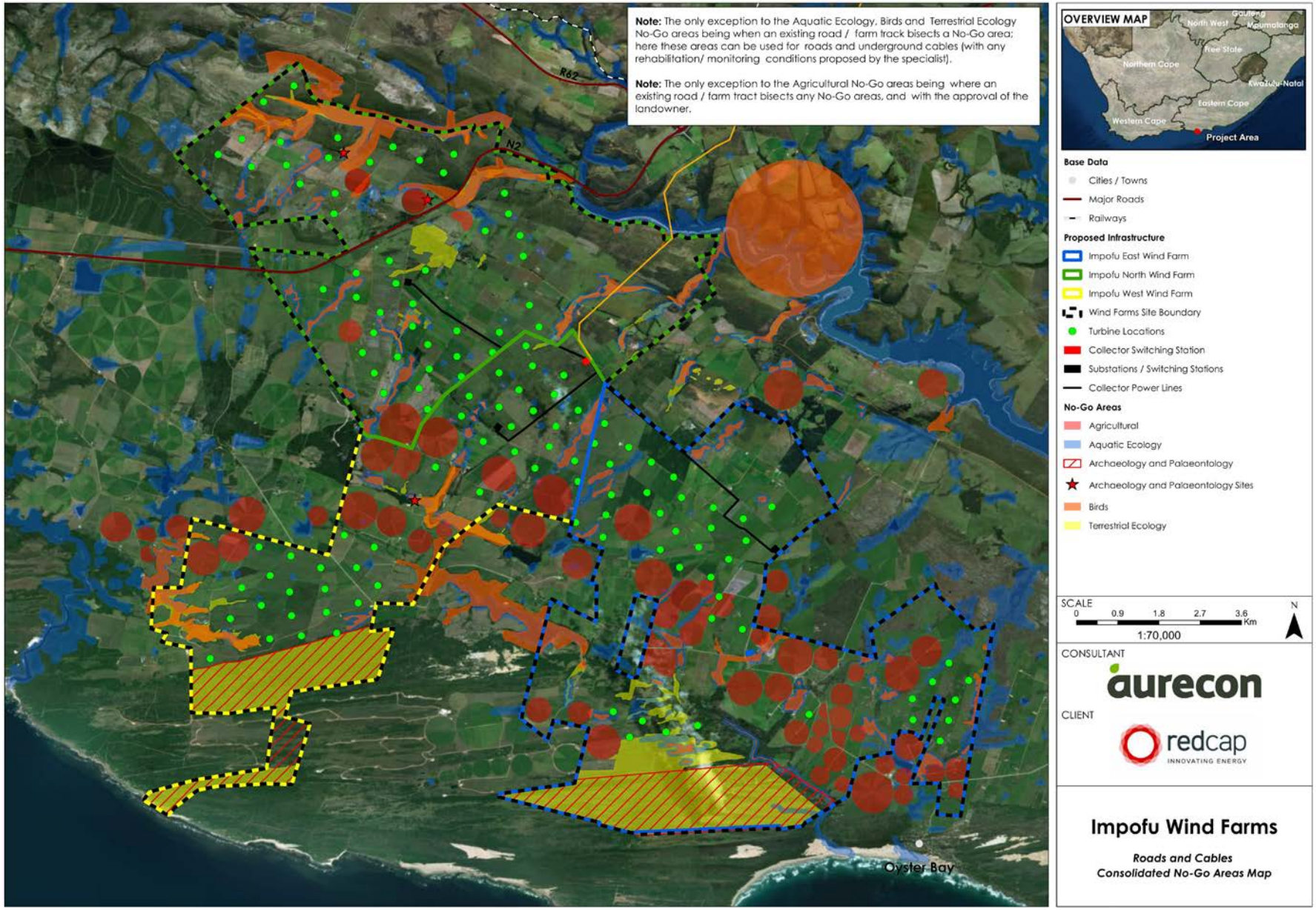

Figure 5.4: Planning and environmental consolidated No-Go areas for roads and underground cables (Impofu West Wind Farm outlined in yellow)

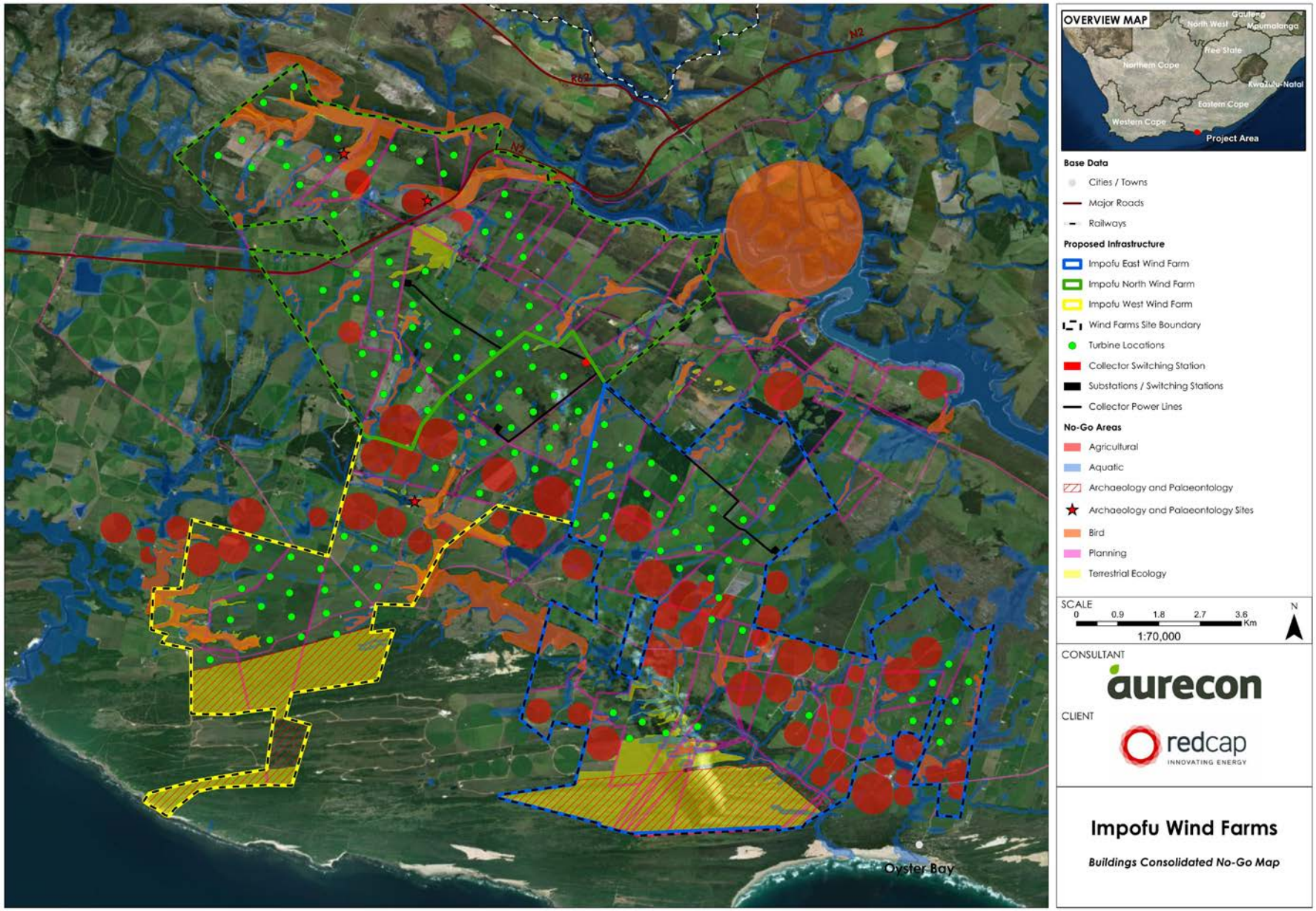

Figure 5.5: Planning and environmental consolidated No-Go areas for buildings (Impofu West Wind Farm outlined in yellow)

5.4 Technology alternatives

The primary technology that could influence the project environmental and social impacts is that of the turbine specifications e.g. blade length, hub height etc. As described in Section 6, technology could evolve by the time of construction therefore a worst-case scenario has been adopted to allow for a range of specifications to which the final turbine to be used must conform. As no one turbine will have all these specifications, by basing the assessment on all these specifications it is ensured that the final impact would be less than the worst-case scenario that this assessment is based on. This approach results in the precautionary principle being used with regard to uncertainties with final turbine technology. Refer to Figure 6.6 in Section 6.3 for the details of the exacerbated rotor swept area envelope that has been assessed.

In terms of potential alternatives to traditional horizontal axis wind turbines, bladeless turbine technology is under development and would reduce or negate a number of potentially negative environmental and social impacts which is favourable. However, other factors need to be considered when selecting a technology type and this includes those that prove to be most feasible (i.e. cost effective), have the highest energy conversion factor as well as having a proven track record in the industry. At this point in time, bladeless technology is not considered commercially viable for large scale turbines (2-5 MW) nor has a proven track record in the commercial wind generation market.

In addition, the South African Government's REIPPPP rules, as set by the DoE, specifically require a type certification of the specific wind turbine that is proposed, which to date has only been given to the horizontal axis wind turbines currently in large scale commercial production.

For this reason, a worst-case scenario has been applied to the traditional horizontal axis wind turbines and technology alternatives have been screened out of the EIA process.

5.5 No-Go alternative

The No-Go alternative assumes that the project is not developed and the activity does not go ahead. This alternative can provide the baseline scenario against which other alternatives can be compared. In this case the negative impacts of the project would not be experienced but the benefits of the project would be foregone. The opportunity to provide renewable energy contributing to national targets would also not be achieved in this instance. Similarly, potential negative impacts assessed in Section 7 would not be incurred.

6 Project description

6.1 Site location and description

The Impofu West Wind Farm is proposed as one of three possible Impofu Wind Farms to be developed on a consolidated site amongst adjacent operational wind farms (refer to Section 1.2 and Figure 1.2). The broader area was formerly solely rural in character, but has transitioned to a renewable energy landscape due to the presence of wind turbines and associated infrastructure in the area.

The proposed Impofu West Wind Farm as taken from the centre point of the site, is located approximately 24 km south-west of Humansdorp, and 14 km north-west of Oyster Bay, in the Sarah Baartman District Municipality in the Eastern Cape. The project site area falls within the jurisdiction of the Kouga Local Municipality. The site is bordered immediately to the west by the existing Tsitsikamma Community Wind Farm.

The site can be reached via the N2 National Road and R102 Main Road. The Impofu West Wind Farm site comprises 9 adjoining farm portions, as listed in Table 6.1, cumulatively measuring approximately 2,760 ha in extent (Figure 6.1).

The primary land use of the site is agriculture, namely dairy farming. As such, there are several farm dams and farmsteads on the site, and numerous internal farm and gravel access roads.

Table 6.1: Property details for the proposed project

Name of landowner	Erf number	21-digit SG code	Name of farm	Farm Size (ha)
Rosenhof Trust	1/717	C03400000000071700001	Lange Fontein	988.668
Kliprug Familie Trust	818	C03400000000081800000	Bloemkomlaan	362.183
Steynberg Boerdery Trust	1/676	C03400000000067600000	Kliprug	424.734
Johan Andries du Preez	2/676	C03400000000067600002	Ou werf deel van die plaas Rooi Draai	214.2161
Sparreberg Pty Ltd	840	C03400000000084000000	Driefontein	565.834
Kliprug Familie Trust	3/676	C03400000000067600003	Kliprug	286.371
John Strydom Family Trust	2/720	C03400000000072000002	Driefontein	719.462
Conrad Dreyer Family Trust	RE/716	C03400000000071600000	Pow Fontein	300.9499
Kakebeenbos Boerdery Trust	RE/678	C03400000000067800000	Kakebeenbos	216.511

6.2 Site layout

The proposed site layout for Impofu West Wind Farm depicted in Figure 6.2 was the outcome of the Screening and Integrated Design Process for the Impofu Wind Farms consolidated site as described in Section 5 (Alternatives rationale).

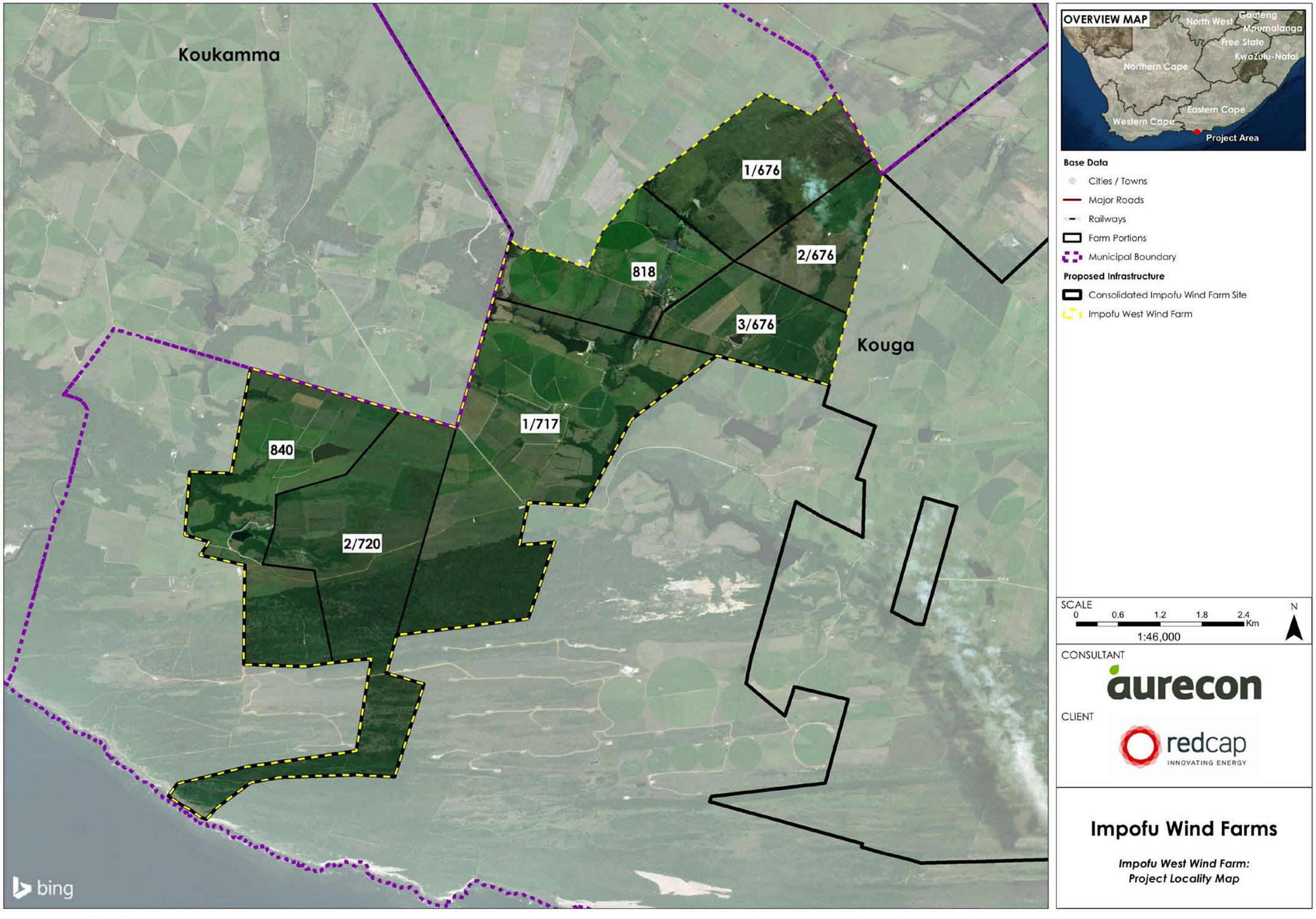

Figure 6.1: Impofu West Wind Farm affected properties

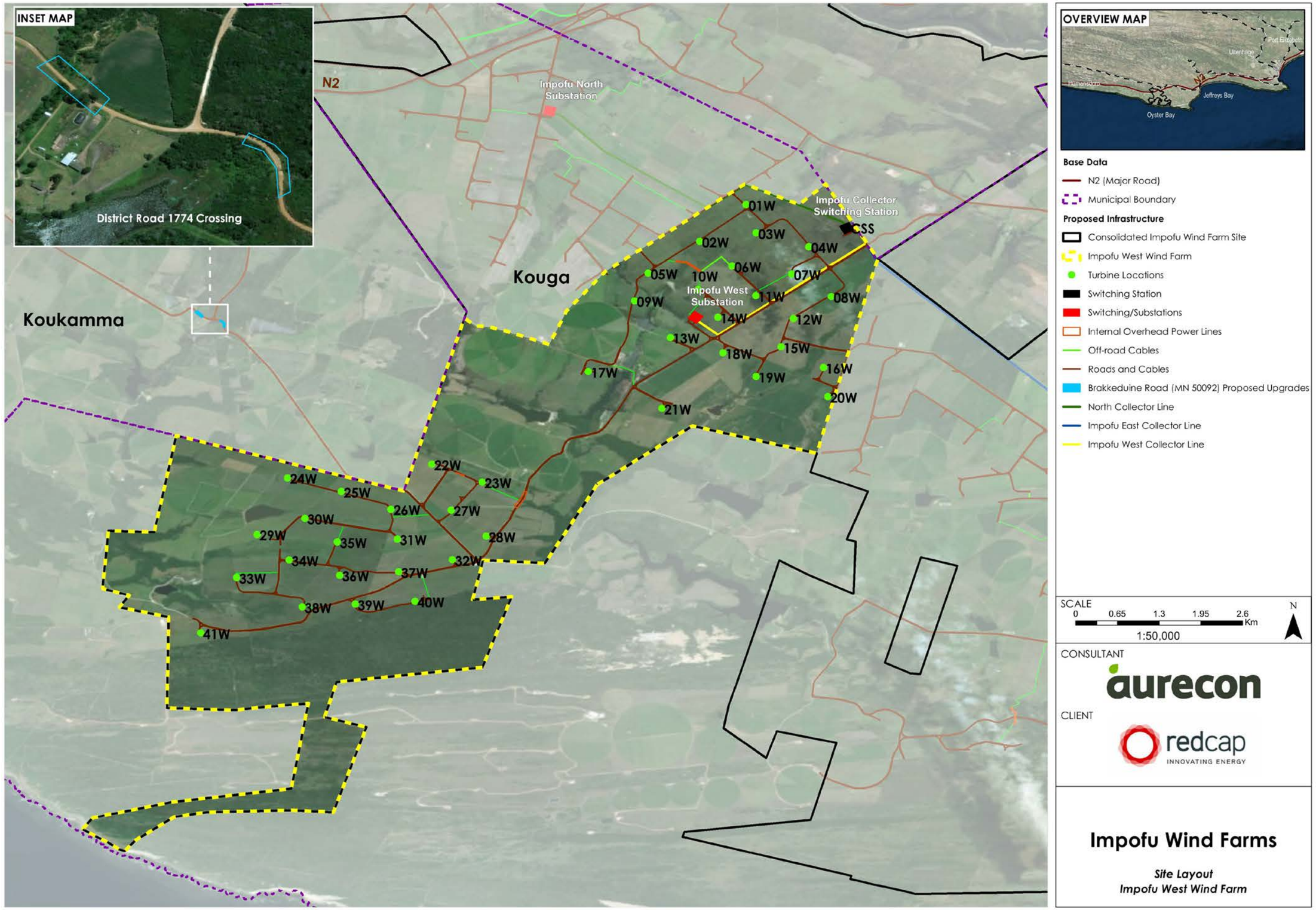

Figure 6.2: Proposed site layout for Impofu West Wind Farm

6.3 Wind farm components

A wind farm, requires a number of key components to facilitate the generation of electricity at a large scale. As illustrated in Figure 6.3, this includes wind turbines, powerlines and substation facilities to collect the generated electricity and distribute it to other users. The associated connecting infrastructure such as roads, transformers and cabling etc. are designed to ensure project and energy efficiency.

This sub-section describes the components required for Impofu West Wind Farm, with reference to the proposed site layout; as well as providing additional information regarding typical wind turbine technology.

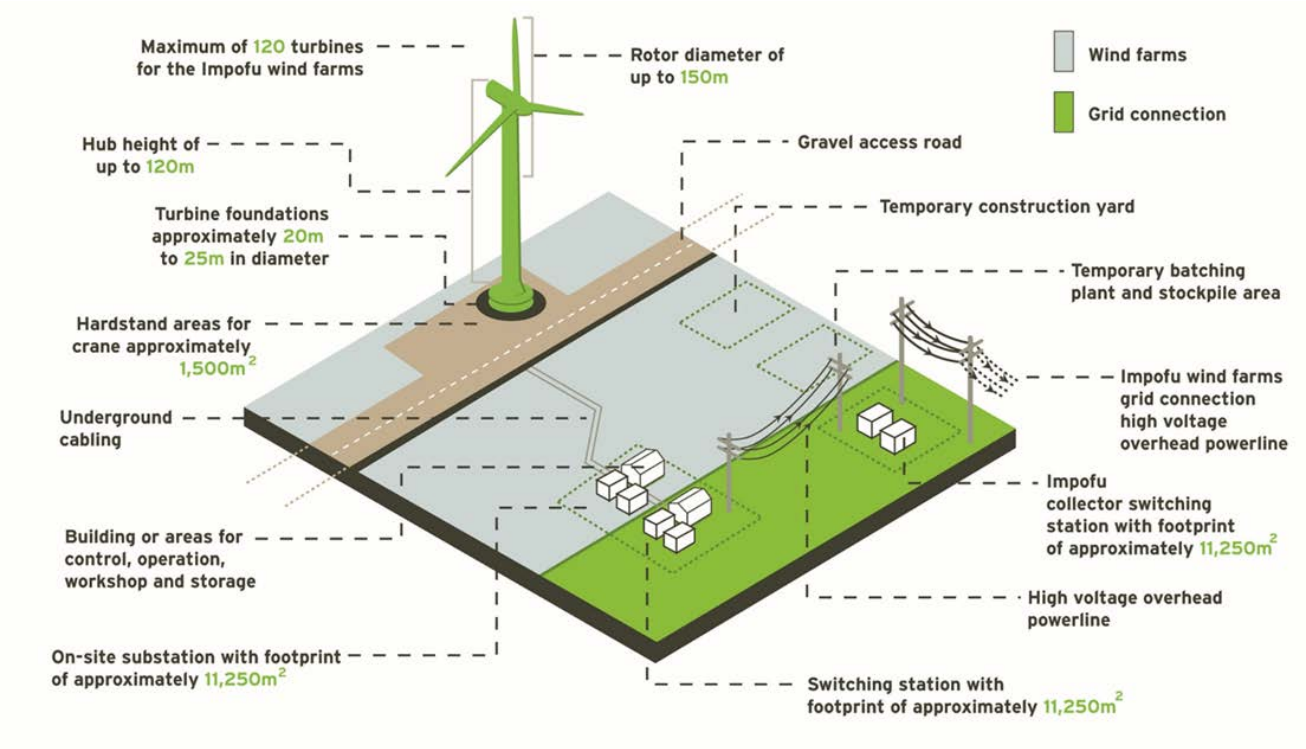

Figure 6.3: Components of the Impofu Wind Farms

6.3.1 Wind turbines

A wind turbine is a rotary device that extracts energy from the wind. The mechanical energy generated is converted to electricity. Wind turbines can rotate about either on a horizontal or vertical axis. Turbines used in wind farms for commercial production of electricity are usually horizontal axis, three-bladed and pointed into the wind by computer-controlled motors, as is proposed for this project. These have high tip speeds of over 320 km/hour, high efficiency, and low torque ripple, which contribute to good reliability. Figure 6.4 and Figure 6.5 provide illustrations of the external and internal components that make up a typical wind turbine.

6.3.1.1 Rotor and blades

The rotor has three blades that typically rotate at 5 – 25 revolutions per minute (rpm) depending on the make and set-up of the turbine, as well as the wind speed on site. The blades are usually coloured white or light grey, and vary in length.

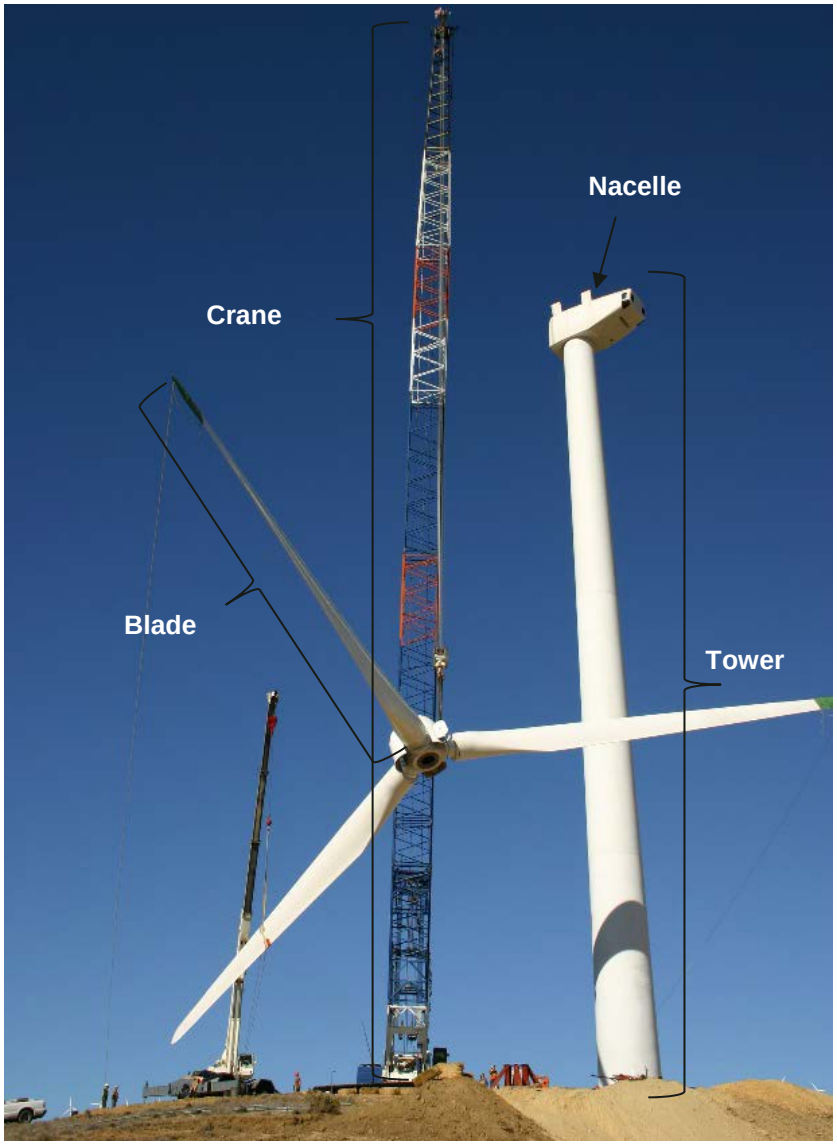

Figure 6.4: External components of a wind turbine tower

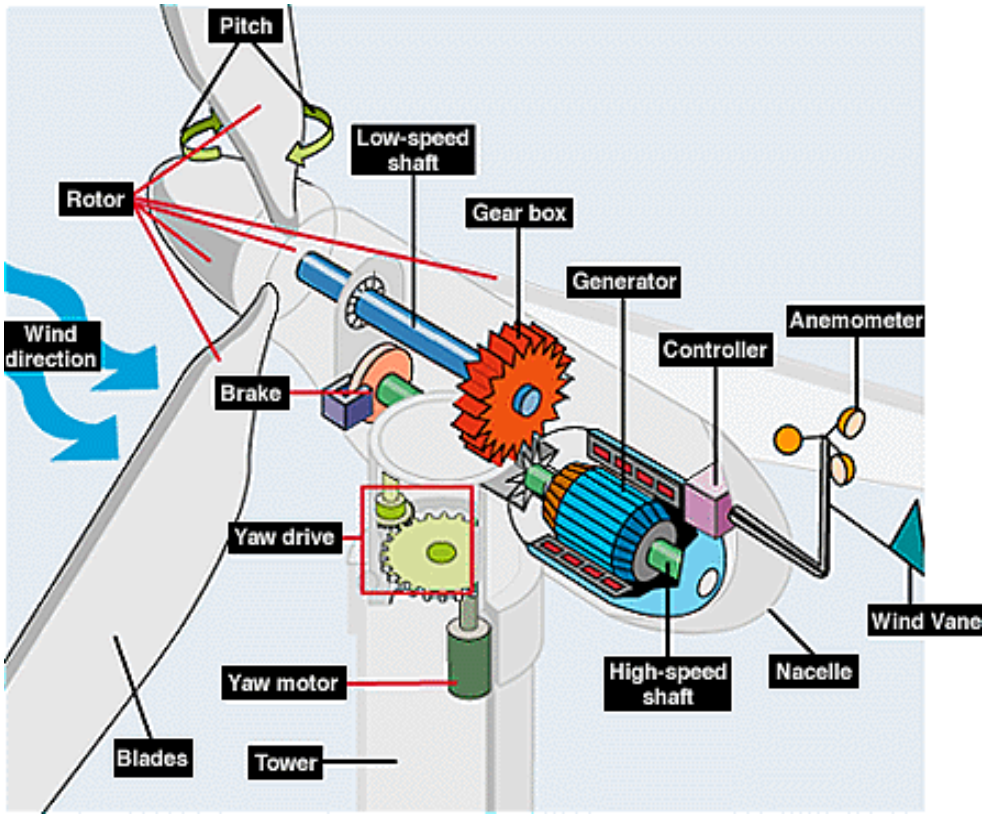

Figure 6.5: Internal components of a typical wind turbine

6.3.1.2 Nacelle

Larger wind turbines are typically actively controlled to face the wind direction, which is measured by a wind vane situated on the back of the nacelle. By reducing the misalignment between wind and turbine pointing direction (yaw angle), the power output is maximised and non-symmetrical loads minimised. The nacelle turns the turbine to face into the wind ('yaw control'). The nacelle also contains the generator, control equipment, gearbox and wind speed instrument (anemometer) to monitor the wind speed and direction.

The turbine controls the angle of the blades ('pitch control') to make optimal use of the available wind and avoid damage at high wind speeds. By turning the blades sideways into the wind, i.e. away from the direction of the wind ('furling'), the turbine ceases its rotation, accompanied by both electromagnetic and mechanical brakes. This would typically occur at very high wind speeds, typically over 72 km/h (20 m/s), depending on the characteristics of the specific turbine. The wind speed at which shut down occurs is called the cut-out speed. The cut-out speed is a safety feature which protects the wind turbine from damage. Normal wind turbine operation usually resumes when the wind drops back to a safe level.

6.3.1.3 Generator

The generator converts the turning motion of the blades into electricity. A gear box is commonly used for stepping up the speed of the generator. Inside the generator, wire coils rotate in a magnetic field to produce electricity. Each turbine has a transformer that steps up the voltage to match the powerline frequency and voltage for electricity evacuation / distribution. The transformer may be located inside the turbine tower, or within a small housing at the base of the tower.

6.3.1.4 Tower

The tower is constructed from tubular steel or concrete and supports the rotor and nacelle. Towers can vary in height and are dependent on the selected turbine. This height is referred to as "hub height." Wind has greater velocity at higher altitudes, therefore increasing the height of a turbine increases the expected wind speeds and electricity output.

6.3.1.5 Foundation

Foundations are designed to factor in both weight (vertical load) and lateral wind pressure (horizontal load). Considerable attention is given when designing the footings to ensure that the turbines are adequately grounded to operate safely and efficiently. The final foundation design of the proposed turbines is dependent on a geotechnical investigation.

As depicted on Figure 6.2, the Impofu West Wind Farm has been designed to have up to 41 wind turbine locations. Each turbine would have a circular foundation of approximately 20-25 m diameter, a temporary disturbed area including the foundation, the hardstand and construction area of approximately 100 x 50 m for use as a laydown area and to accommodate a crane pad during installation, with a permanent hardstand footprint of approximately 50 x 30 m remaining for maintenance purposes (see illustration in Figure 6.3).

With regards to the exact turbine model and specifications that would be developed, it is not possible to finalise this decision until closer to the construction period. This is because turbine technology is continually improving globally and it is not possible at this early stage of the project to know the exact turbine model and specifications that would be available at the time of development. However, it is anticipated that the MW size of the turbine would be about 3-5 MW. Since the exact turbine model is not known, assumptions have been made as to the maximum possible area of impact by the potential turbine blades based on a range of turbine sizes. This area of impact is referred to as the "exacerbated rotor swept area envelope", as it 1) takes into account multiple turbine sizes at once, and 2) assumes each turbine has the largest blade it can from the lowest hub height and extends this all the way up to the highest hub height (see Figure 6.6).

Exacerbated rotor swept area envelope:

1. Rotor diameter: maximum of 150 m (75 m blade / radius)

2. Hub height: range from 90 to 120 m

3. Tip height: maximum based on 120 m hub + 75 m blade = 195 m

4. Tip height: minimum of 30 m (and not lower)

Resulting in an envelope between 30 m up to 195 m; 150 m wide, with a hub height within this between 90-120 m high.

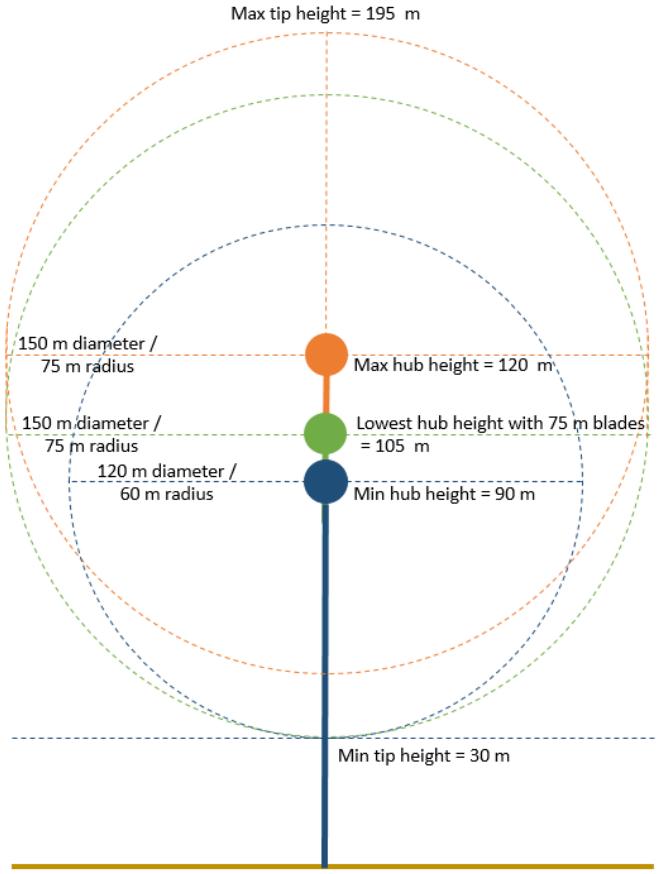

Figure 6.6: Exacerbated rotor swept area envelope

6.3.2 Transmission and distribution

The electricity generated by the turbines needs to be collected, transformed and then distributed to the national grid. The “step-up” process that occurs within the footprint of the Impofu West Wind Farm will be included in this EIA process. However, the evacuation of electricity via a new powerline to connect to the national grid will be assessed in a separate BA process for the proposed Grid Corridor.

6.3.2.1 Cabling

Each turbine will be connected to the substation via medium voltage cables (~33 kV lines). Where feasible, these cables will be laid underground in trenches, generally running alongside new or proposed internal roads. Where burying of cables is not possible due to technical, geological, environmental or topographical constraints, then overhead powerlines will be erected.

Figure 6.2 depicts the ‘Roads and Cables’ where cables run alongside proposed or existing roads, the ‘Off-road Cables’ where cables that will not run alongside proposed or existing roads, and the ‘Internal Overhead Powerlines’ which all make up the internal powerline network.

6.3.2.2 On-site substation and transformer

The purpose of the on-site transformer and substation is to increase ("step-up") the voltage of the electricity from 33 kV to 132 kV. Energy produced by the turbines will be transmitted via medium voltage (~33 kV or lower) cables to the on-site collector substation named 'Impofu West Substation', refer to Figure 6.2. The entire substation facility will cover an area of approximately 11,250 m^2 (approximately 150 m x 7 5 m). The adjoining Eskom switching stations would be of a similar size. The substation area would house buildings or areas for control, operation, workshop and storage as indicated in Figure 6.3. A control room will measure power voltage, input, output, power fluctuation and other performance information. The remainder of the substation is comprised of facilities and infrastructure typical of a substation, including an area with a subterranean earthing mat, onto which a number of concrete plinths are constructed. This, together with a number of earthing rods, will provide an earth for lighting and possible short circuit currents. Switching gear, step-up transformers and protection equipment are also mounted on concrete plinths within the collector station. The adjoining Eskom switching stations would include equipment such as transformers and bus bars but are not part of this Application.

Figure 6.7: Substation / switching station

6.3.2.3 Grid Connection

A Grid Connection of approximately 120 km is required to evacuate the power generated by the proposed Impofu West Wind Farm (as well as Impofu East and Impofu North Wind Farms) to the NMBM Chatty substation.

The Proponent may either apply for an Independent Power Producer (IPP) contract in an upcoming bid round of the DoE's REIPPPP and therefore the power would be sold to Eskom; or the power could be sold to a Municipality or large private offtaker through a 'private to private' agreement.

This Grid Connection is the subject of a separate BA process and does not form part of this Application for environmental authorisation. The BA process is being undertaken in parallel with the Scoping and EIR processes for the three Impofu Wind Farms, so that the Final BAR can be submitted at a similar time as the Final EIRs for the Wind Farms. This will allow the competent authority to take into account the impacts of all four Applications at the same time during their decision-making process.

The Grid Connection includes the following components, some of which are depicted on Figure 6.2:

Collector powerline

A 132 kV high voltage overhead line is required to link up the on-site Impofu West Substation, to a combined central collector switching station ('Impofu Collector Switching Station'). This line is approximately 3 km in length. The collector powerline is depicted on Figure 6.2 as the 'Impofu West Collector Line'.

Collector switching station

The role of the 'Impofu Collector Switching Station' is to consolidate the three power lines from Impofu West, Impofu East and Impofu North Wind Farms into one, such that a single line continues from here onwards. This will also allow Eskom more control over the management of the wind farms' connections into the national grid. The Impofu Collector Switching Station will cover an area of approximately 11,250 m^2 (approximately 150 m x 75 m) and is depicted on Figure 6.2.

Powerline from the consolidated site to PE

The remaining 132 kV overhead power line is approximately 115 km in length and travels from the Impofu Collector Switching Station through the Eskom Melkhout substation located just north of Humansdorp and will continue to the western outskirts of Port Elizabeth (PE) where it connects into the NMBM Sans Souci substation. From Sans Souci substation the line then continues to the NMBM Chatty substation where the grid connection terminates. The reason the power line goes through the Eskom Melkhout substation and the NMBM Sans Souci substation is to improve the evacuation capacity and technical parameters of the grid connection, as well as improving the overall stability and reliability of the Eskom and NMBM networks.

6.3.3 Additional infrastructure

6.3.3.1 Access, service roads and sidings

The site will be accessed from the District Road 1774 and MN50032 as these roads pass through the site. The DR1774 crosses a watercourse and will require upgrading at this point, refer to the Inset Map on Figure 6.2. Access and service roads will be required to access the wind farm area as well as each turbine site. These roads are shown as 'Roads and Cables' on Figure 6.2.

The internal gravel roads will be approximately 6 m wide with potential side drains along the side and of a specification to accommodate the abnormal trucks that will deliver the turbine components. Where possible, existing roads have been proposed to be upgraded to avoid additional clearance of natural or agricultural land cover. New roads will be established where needed. In exceptional circumstances short sections of the roads may be surfaced with bitumen or concrete if they are excessively steep. More information on access roads for haulage is provided in Section 6.5.

6.3.3.2 Fencing

A security gate and associated guard house may be placed at the entrance to the wind farm site. This is aimed at preventing unauthorised vehicular access to the facility. No fencing will be used around individual turbines themselves and existing fencing will remain around the perimeter of the properties. This will enable livestock and wild fauna to continue to utilise the area underneath the turbines as rangeland or a migratory corridor. Fencing up to 3 m high will be erected around the onsite substation and operations and maintenance complex for security and safety reasons during the operational phase. The temporary construction camp (described further below) will also be fenced and should be kept secure for the duration of the construction period. Additional construction phase fencing will be brought on where needed in consultation with landowners.

6.3.3.3 Water and electricity

A preliminary approximation of the water requirements for the construction phase of the proposed wind farm are as follows:

- During the construction period (18 - 24 months) water will largely be used for the following: road construction; hardstand compaction; concrete foundations; cleaning equipment after concrete pours and dust suppression on roads. It is anticipated that 80,000 m^3 will be used during construction.
- During the operational phase (approximately 20 years) water would be required for road maintenance, for the grading and re-compacting of the roads. It is anticipated that water consumption would be approximately 2,000 m^3 per annum.

Several water header tanks will be used to provide potable water. Potable water will be sourced from the property, or neighbouring farmers (under agreement) and piped or trucked to site as required during the construction and operational phases.

Basic sanitation will be provided on site during the construction and operational phases in the form of portable toilets and conservancy tanks. Wastewater will be collected at regular intervals and transported to the Municipal Waste Water Treatment Works.

Electricity for construction could be obtained from Eskom, temporary diesel generators and possibly small scale mobile photovoltaic units.

6.4 Timeframes

It is unknown at this stage when construction would commence, as this would be dependent on the REIPPPP programme and other related permit requirements for a wind farm, however it is anticipated that construction would commence within the next five years. The construction period would be an anticipated duration of 18 – 24 months. Should decommissioning occur, this would only be likely after approximately 20 years as described in Section 6.7.4 below.

6.5 Materials, resources and haulage

A number of materials and resources would have to be brought onto site to facilitate construction including, water, sand, stone, bricks, cement, steel etc. Furthermore, construction waste and spoil would be generated and would need to be transported offsite where not possible to reuse on the site.

In terms of haulage, certain wind turbine components will be imported into South Africa. Thus, the origin of the transportation routes to site would start at one of the ports in Southern Africa (most likely Saldanha or Coega). Fortunately, the proposed site is within an existing wind energy node and as such, many of the challenges faced by the route would have been tested.

During construction, internal roads are needed to accommodate low bed trucks delivering turbine components as well as the mobile high lift cranes where needed to erect the turbines themselves, amongst other heavy construction vehicles. Typical heavy loads are illustrated in Figure 6.8. Where necessary, road deviations to the final layout may be required to ensure that the corners are opened and gradients are reduced to accommodate the delivery of abnormal loads to the site. Roads may need to be widened up to 12 m to accommodate the vehicles. These internal haulage roads will be rehabilitated down to 6 m after construction is complete, or rehabilitated completely if the haulage road is no longer required as an access road during the operational phase.

Figure 6.8: Tower section in low load configuration shown in top photo; and blade shown in bottom photo

6.6 Employment

During the construction phase of the project, a significant number of temporary job opportunities will be created. These include highly skilled, semi-skilled and unskilled positions. Similarly, the project will also generate permanent job opportunities throughout operation. It is intended that preference will be given, as far as possible, to those people living in the area. The number of opportunities are not available at this conceptual phase of the project, however, the related impacts are assessed in Section 7.8 (Socio-economic) and more details will be available at the EIA Phase.

6.7 Project phases

6.7.1 Pre-construction

Pre-construction activities involve tasks that establish the site. Typical activities associated with the pre-construction phase are summarised as follows:

- The site layout will be confirmed on site through a micro-siting process.
- The footprint boundaries and No-Go areas will be identified.
- Site clearance will occur for the formal laydown areas, turbine footprints, access routes, construction camps, on-site substation and other buildings or areas for control, operation workshop and storage.
- Storage areas for materials and spoil and topsoil stockpiles should be identified.
- Materials, resources, equipment and turbine components will be transported to the site. More information on materials, resources and haulage is provided in Section 6.5.

- Within the formal laydown areas, a maintenance and storage building along with a guard cabin will be established for the duration of the construction period as well as possible turbine tower construction areas, if concrete towers are used.
- Smaller manageable components of the turbines will be placed on the laydown areas, whereas larger more cumbersome structures, such as the blades, will likely be taken directly to the assembly point.

6.7.2 Construction

Typical activities associated with the construction phase are summarised as follows:

- The construction camp will be established along with batching plant and possible concrete turbine towers construction area.
- The internal roads to access the wind farm areas will be constructed; existing farm roads will be use where possible and upgraded (refer to Section 6.5 for information on haulage).
- Preparation of the crane hardstand for each turbine which will remain in place after construction (as described in Section 6.3.1.5).
- Construction of foundations for each turbine.
- Each turbine will be assembled in sections, refer to Figure 6.9 for an example.
- Connections to the overhead on-site substation will be developed in the form of trenching and laying of underground cables as well as installing pylons and stringing of the overhead powerlines.
- Rehabilitation during the construction phase will be undertaken in a phased approach and will continue into the operational phase.

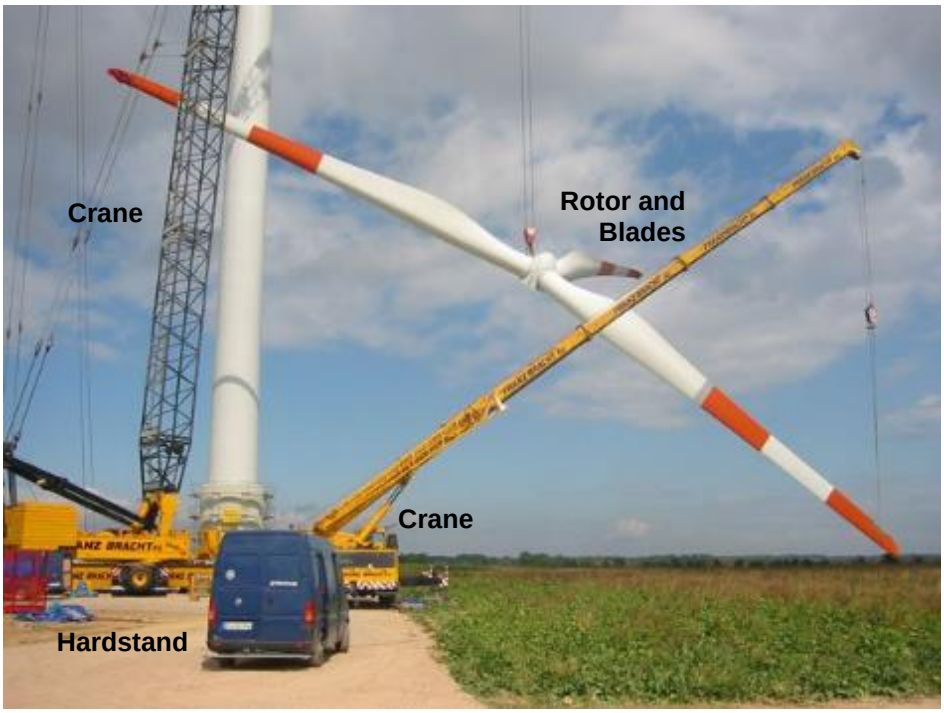

Figure 6.9: Wind turbine in the process of being assembled

6.7.3 Operation

During operation, the following activities will occur:

- The areas disturbed during the construction phase will be rehabilitated in a phased approach during the operational phase.
- The rehabilitated areas and areas unaffected by the turbines and associated infrastructure will remain available to the farmers as pasture, or retained as natural areas.

- There would be buildings or areas for control, operation, workshop and storage activities as indicated on Figure 6.3.
- Turbines are designed to operate continuously, unattended and with low maintenance for more than 20 years. Once operating, the proposed wind turbines will be monitored and controlled from the control room and also possibly remotely using telemetric systems. There will also be an operational team on site that monitors the wind farm and turbines and maintains the infrastructure.
- A post-construction monitoring programme for birds and bats will also continue into the operational phase for a minimum period of two years.

6.7.4 Decommissioning

The proposed project has an intended project lifespan of approximately 20 years, based on the mechanical characteristics of the turbines, and the fact that a maximum of a 20-year power purchase agreement can be signed with Eskom under the REIPPPP programme. At the end of the 20-year operational phase, the lifespan of the wind farm may be extended (subject to the necessary authorisations and agreements with the landowners, Eskom and the DoE), in which case the turbines may be refurbished / upgraded, or replaced with the latest turbine technology at that time.

Alternatively, should the lifespan of the wind farm not be extended beyond the 20-year operational phase, the facility will be decommissioned. Decommissioning is expected to take between 12 to 18 months and would include the following activities:

- Ceasing of electricity generation.
- Disconnection of the wind farm infrastructure from the electricity network.
- The components of the facility would be disassembled, then removed and reused or recycled as far as possible.
- All underground cables would be excavated and removed, or left *in situ* if appropriate.
- The buildings and associated infrastructure would be demolished and removed by an authorised company.
- Rehabilitation of the disturbed areas would be required, with the aim of restoring the land to its original characteristics (or as near as possible).

6.8 Need and desirability

The ‘need and desirability’ of the project should be evaluated against the strategic context of the development proposal along with the broader societal needs and public interest. According to the DEA Guideline on Need and Desirability (DEA, 2017), the concept of ‘need and desirability’ relates to the *“nature, scale and location of development being proposed, as well as the wise use of land”*. The concept of ‘need and desirability’ can be explained in terms of the broader meaning of its two components, need primarily referring to time, and desirability to place. It is acknowledged that ‘need and desirability’ are interrelated and the two components collectively should be considered in an integrated and holistic manner.

According to the DEA Guideline (DEA, 2017), the strategic context for the need and desirability of an activity can be reviewed in light of what is envisioned for a specific area, specifically what has been proposed in a municipal IDP and SDF. These planning tools provide direction as to the desired spatial form of a municipality. Similarly, municipal Environmental Management Frameworks (EMFs) also provide the desired spatial form in terms of the environmental context of an area. Furthermore, the DEA Guideline (DEA, 2017) states that the need and desirability of an activity should be evaluated against the principles of “*promoting justifiable economic and social development*" as well as the principles of “*securing ecological sustainable development and use of natural resources*" as set out set out in the bill of rights in the Constitution.

As introduced in Section 1.1 and supported by the numerous policies and legislation described in Section 3.3, the need for renewable energy is well documented. Wind energy is desirable as it:

- Creates a more **sustainable economy** by promoting South Africa's energy policy towards energy diversification;
- **Reduces the demand on scarce resources** such as water by promoting energy generating facilities which are less resource intensive;
- Assists in **meeting nationally appropriate carbon emission targets** in line with global climate change commitments by reducing reliance on coal as an energy source;
- **Reduces and, where possible, eliminates pollution** by using cleaner energy generating mechanisms and reducing the demand on carbon based fuels;
- Promotes local economic development by **creating jobs and promoting skills development**; and
- Enhances **energy security** by diversifying generation to reduce reliance on coal, which is non-renewable, as a primary energy source and promoting renewable energy generation.

Table 6.2 below aims to provide more detailed responses with regards to the project specific responses to the questions raised in the Need and Desirability guidelines of DEA (2017) and the Western Cape Government: Department of Environmental Affairs and Development Planning (DEA&DP) (2013). The responses were compiled taking into consideration the Eastern Cape Provincial Spatial Development Plan, Eastern Cape Climate Change Response Strategy, IDPs, SDFs, the Local Economic Development (LED) Strategy and the outcome of the project screening phase during which No-Go areas where identified based on environmental and socio-economic considerations (as described in Section 5).

Table 6.2: Need (timing) of the proposed project (based on the 2017 DEA and 2013 DEA&DP Guidelines)

Question	Response
1. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority i.e. is the proposed development in line with the projects and programmes identified as priorities within the Integrated Development Plan (IDP)?	Renewable energy projects have been prioritised in strategies at various municipal scales in the area. At the provincial level, the Eastern Cape Provincial Economic Development Strategy (2017) seeks to create a clear, long-term vision and strategy for the growth and development of the province by building on six high potential economic sectors, one of which is sustainable energy. The Eastern Cape Sustainable Energy Strategy (2012) lays out the province's strategic direction in terms of the renewable energy industry focusing on encouraging sustainable, affordable and environmentally friendly energy production by creating an enabling environment for energy production and sustainable technology, skills and industry development. The Sarah Baartman District Municipality IDP identifies investment in renewable energy, particularly wind, as potential projects with significant economic spinoffs for the region. It also identifies renewable energy investment as a key means by which to address the electrical infrastructure backlog within the district. The Sarah Baartman District Municipality SDF acknowledges this economic opportunity, but also considers the potential negative impact on ecotourism of the district due to the potential changes to the visual and cultural landscapes. Within the Kouga Local Municipality, renewable energy (specifically wind farms) have been identified as key contributors to the economy of the municipality. The LED and SDF consider the role of the municipality manging potential conflicts with other economic development initiatives.
2. Should development, or if applicable, expansion of the town/ area concerned in terms of this land use (associated with the activity being applied for) occur at this point in time?	Yes. The proposed project is in line with the Sarah Baartman District Municipality's medium term strategic framework that focuses on investment in alternative energy sources, e.g. wind, that will stimulate secondary opportunities for economic growth. The proposed project also has both national and global significance as it aligns with national policy direction as well as contributing to South Africa being able to meet some of its international climate change obligations, by

Question	Response
	aligning domestic policy with internationally agreed strategies and standards as those set by the United Nations Framework Convention on Climate Change. Other reasons why timing is considered to be right for renewable energy within this landscape includes firstly, the nearby location for the proposed Thyspunt nuclear energy facility that was not selected as the preferred site for nuclear in South Africa in the long term. Secondly, with the recent construction of nearby wind farms in the landscape, a host of locally based manufacturing and training facilities have been established in the surrounding areas like Port Elizabeth.
3. Does the community/ area need the activity and the associated land use concerned (is it a societal priority)?	Yes. The Sarah Baartman District Municipality identifies a green economy (including, but not limited to renewable energy and ecosystem services) as a focal point for economic development in the district, noting that such investments are likely to have significant economic spinoffs for the region. With the provision of the Impofu Grid Connection, the proposed Impofu West Wind Farm would also directly benefit the local community. Firstly, it would be a source of income to the landowners of the properties on which the wind turbines are located, and would improve the economic viability of the landowner's current farming operations. Secondly, it would also create direct and indirect job opportunities for the local community; who have already been exposed to the work required since the construction of the surrounding existing wind farms. Secondary economic benefits may include an increase in service amenities through an increase in contractors and associated demand for accommodation and other services. A percentage of the operational revenue of the project will be utilised to support local socio-economic development initiatives, due to the requirements in this regard of the REIPPPP. The local municipality will play a strong role in guiding how the funds are utilised, thus ensuring that relevant and pressing needs in the community will be addressed.
4. Are there necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	No municipal services (water, sewerage, electricity) will be required at the site, as the project contractor or appointed sub-contractor/s will be responsible for providing the necessary services to the site during the construction and decommissioning phases. Electricity will be supplied to the site via existing Eskom lines, generators and/or on-site renewable energy installations (e.g. solar panels). Waste produced at the site will be collected and taken to an appropriate facility with sufficient capacity to accept the waste, for recycling, re-use, treatment or disposal (as appropriate). No municipal waste collection will be required at the site. However, the capacity of the municipal waste streams will need to be determined prior to construction. It is unfeasible to consider this during the EIA process as construction of this project may only begin in more than three years, if the project is granted all authorisations and should the project be submitted into a future bidding round, then once it is selected as a preferred bidder in terms of REIPPPP. Should any need for other services arise the relevant authority will be communicated with, and the necessary approvals/ agreements obtained before proceeding.
5. Is this development provided for in the infrastructure planning of the municipality, and if not, what will the implication be on the infrastructure planning of the municipality (priority and placements of services)?	Yes. Although the proposed project is not specifically mentioned in the municipal planning reports, reference is however made of wind energy projects within the Sarah Baartman District Municipality's jurisdiction. The SBDM's IDP further notes that both the national and provincial governments have prioritised renewable energy, with the Eastern Cape

Question	Response
	placing particular emphasis on wind energy. The municipalities (Sarah Baartman and Kouga) IDPs concurs with this, identifying the development of wind farms as major economic projects that have the potential to create employment and address poverty in the area. The proposed development will have little bearing on the infrastructure planning of the municipality and will be situated on privately owned land. Water, sanitation and electrical services required for the construction of the project will be provided by the appointed contractor, and additional municipal services are not expected to be required for the proposed development (e.g. potable water will be piped from sources on site or trucked to site, wastewater will be collected in conservancy tanks and transported to an appropriate wastewater treatment site, on-site generators will be utilised etc.). Should municipal services be required, these will be confirmed and agreed with the municipality prior to commencing. Should the municipality be unable to provide the necessary services, then the applicant (or their appointed contractor) will be responsible for providing the necessary services to the site via use of private service providers.
6. Is this project part of a national programme to address an issue of national concern or importance?	Yes. The establishment of the proposed project would maintain the national DoE mandate to ensure efficient supply of electricity to service the South African economy and society by strengthening the existing electricity grid for the area. In 2015 South Africa experienced serious energy constraints which was a barrier to economic growth. The proposed development is thus an issue of national concern and importance. Moreover, the project would contribute towards meeting the national energy targets as set by the DoE, of which a share of all new power generation being derived from IPPs. The 2010 Integrated Resource Plan (IRP) developed by the DoE for the 2010 to 2030 period aims to achieve a "*balance between an affordable electricity price to support a globally competitive economy, a more sustainable and efficient economy, the creation of local jobs, the demand on scarce resources such as water and the need to meet nationally appropriate emission targets in line with global commitments*". The final IRP provides for an additional 20,409 MW of renewable energy in the electricity mix in South Africa by 2030. Furthermore, the National Development Plan (NDP) proposes to create 11 million jobs and grow the economy at an average rate of 5.4% per annum by 2030. In respect of renewable energy, the NDP seeks to ensure that half of the new future generation capacity comes from renewable energy sources. It furthermore recognises the importance of the transition to a low carbon economy. As such the NDP suggests the following: • Supporting carbon budgeting. • Establishing an economy wide price for carbon by 2030 complemented by energy efficiency and demand management interventions. • Setting a target of 5 million solar water heaters by 2030. • Implementing zero emission building standards that promote energy efficacy. • Simplifying regulatory regime to encourage renewable energy, regional hydroelectric initiative and independent power producers (IPPs).
7. Do location factors favour this land use (associated with the activity applied for) at this place?	Yes. The suitability of the site includes one of the best wind resources in the country and its characteristics measured throughout the year (i.e. the area proposed for the Impofu Wind Farms site lies on a section of coastal plain

Question	Response
	near Cape St Francis and is therefore exposed to winds from the ocean from the south-west and south-east). The location favours this land use also based on the ability of wind energy to operate in conjunction with beef/ dairy farming which is the current main land use on site; the support of the landowners concerned; the avoidance of environmental sensitivities as well as various economic considerations which include the feasibility of the project in terms of financial and technical perspectives.
8. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programmes?	According the Socio-economic Specialist Study (see Section 7 and Appendix C6), the proposed project would have positive impacts related to GDP growth, limited local and preferential procurement (BBBEE, women-owned vendors, etc.), enterprise development, the creation of employment and skills development opportunities, which is compatible with the economic development vision of the SBDM and Kouga Local Municipality. The Sarah Baartman District Municipality Socio-economic and enterprise development (SEEDS) strategy (2016) identifies seven core strategies based both on international trends and other institutions in promoting development in the region. One of the core strategies is "*investment in natural capital which includes creating* ***new generation green jobs*** *and* ***local income streams rooted in renewable energy***". The proposed development is aligned to the LED and SEED strategy. According to the Sarah Baartman Municipality (2017) the district aims to increase the rate of economic growth to create decent job opportunities and sustainable livelihoods. This includes continued investment in infrastructure, local economic growth and tourism that is supported by adequate services such as employment and electricity. The proposed Impofu West Wind Farm would create both employment and business opportunities, as well as an opportunity for skills development and on-site training.
9. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	The potential for the proposed Impofu West Wind Farm to negatively impact on the natural, social and economic environments have been recognised and a number of investigative steps have been identified to ensure a good understanding of these potential impacts throughout the project's life cycle. The first step involved a screening exercise undertaken with specialists which resulted in a proposed layout which minimised impact to sensitive receptors as far as possible (especially in terms of noise and shadow flicker, Appendix C9). The Scoping and EIA Phase identifies further measures to minimise and reduce any residual environmental or social impacts. The outcome of the EIA phase, will culminate in an EMPr that will be applicable to the pre-construction, construction, operational and decommissioning phases of the proposed project (see Section 6.7) to ensure that an environmentally and socio-economically sustainable "cradle to grave" approach is implemented. The EMPr will be managed and implemented as a living document, to allow the development project to adapt to and accommodate unforeseen environmental and/or social and/or political and/or economic changes and needs. For more information on the anticipated impacts and Plan of Study for the EIA phase, please refer to Section 7 and 10 of this report.
10. What measures were taken to ensure the participation of all interested and affected parties? What measures were taken to ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of	The regulated EIA processes are tightly bound by legislative timeframes in terms of NEMA, and thus provide limited opportunity to incorporate and respond to issues raised by I&APs. In a **precautionary approach**, focus group meetings have been undertaken with key stakeholders, authorities and landowners and an additional public comment period will be implemented prior to the official commencement of the Scoping Phase (linked to the submission of the application form to DEA) to enable the project team to

Question	Response
knowledge, including traditional and ordinary knowledge?	better incorporate and communicate the views of the I&APs into the proposed development. Please refer to Section 4.6 for more detail on the public participation process undertaken to date and proposed for the remainder of the project.
11. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.	A detailed response will be provided during the EIA Phase once specialist studies have been completed. Please refer to Section 8 for information on anticipated potential cumulative impacts which will be refined during the EIA Phase in accordance with the methodology proposed in Section 10.
12. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources for the proposed development alternative?)	Yes. Renewable energy projects have been prioritised in strategies at various municipal scales in the area. At the provincial level, the Eastern Cape Provincial Economic Development Strategy (2017) seeks to create a clear, long-term vision and strategy for the growth and development of the province by building on six high potential economic sectors, one of which is sustainable energy. The Eastern Cape Sustainable Energy Strategy (2012) lays out the provincial strategic direction in terms of the renewable energy industry focusing on encouraging sustainable, affordable and environmentally friendly energy production by creating an enabling environment for energy production and sustainable technology, skills and industry development. Although some of the infrastructure for the project would be located on productive agricultural land, the case study undertaken by the agricultural specialist (Lanz, 2018) reveals that the wind farm infrastructure would have an added benefit to the local farmers by providing an alternative income source that would improve the economic viability of existing farming operations. The opportunity costs are thus deemed acceptable. Please also refer to Section 7 for further detail on potential issues and recommendations with regards to anticipated agricultural and socio-economic impacts.
13. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?	Stakeholder engagement is as an important aspect of sustainable development to ensure that adverse environmental impacts are appropriately addressed and not result in discriminating distribution of these impacts. For this reason, the public participation process has been expanded to beyond what is legally required and to enable the project team to better incorporate and communicate the views of the I&APs into the proposed development. Furthermore, the Proponent has demonstrated their commitment to the local community by being part of the Greater Kromme Stewardship initiative which allows private and communal landowners to directly participate and benefit from conservation by securing legal conservation status for their land, and which encourages and supports additional investment, from both the private and government sector into good environmental management.
14. What measures were taken to ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge?	To date focus group meetings have been undertaken with key stakeholders, authorities and landowners to inform the proposed development. In addition, the public participation process required in terms of NEMA will be undertaken as described in Section 4.6 and Appendix B of this report.
15. How was a risk-averse and cautious approach applied in terms of socio-economic impacts?	Screening was undertaken at the pre-feasibility stage to allow environmental and social impacts to be considered early in the project lifecycle and evaluated in an integrated manner with the engineering design considerations. The screening process was specifically based on the identification and mapping of No-Go areas of the site to avoid all

Question	Response
	environmental, socio-economic and technical sensitive areas, and considered both impacts from turbines and other infrastructure (internal overhead power lines, roads, and underground cables and buildings) as separate No-Go layers. The results of the screening study showed that the project is viable and that there are no fatal flaws that should prevent the project moving forward. Specialist studies will however be undertaken to refine results, improve knowledge gaps and confirm mitigation measures required where impacts cannot be avoided altogether. Please refer to Section 4.7 for detail on assumptions, limitations and gaps in knowledge.

Table 6.3: Desirability (placing) of the proposed project (based on the 2017 DEA guideline and 2013 DEA&DP Guideline

Question	Response
1. Is the development the best practicable environmental option (BPEO) for this land/ site?	The land use within the project site boundary is primarily dairy farming which co-exists very well with wind farms. During the Screening and Iterative Design Phase a screening exercise with the project specialists was undertaken and No-Go areas where mapped and incorporated in the proposed layout. Refer to Section 5 for further detail.
2. How will this development use and/or impact on non-renewable and renewable natural resources and the ecosystem of which they are part?	The screening process was undertaken in support of the mitigation hierarchy advocated in NEMA to **avoid** and minimise impacts as the most preferred approach to mitigation. This process and the outputs were collaborative and involved a large multi-disciplinary team of environmental specialists, the EAP, the project engineers and Red Cap as the developer, most of which have extensive knowledge of the area and experience in wind farm assessments generally. The results from this exercise (i.e. the preferred project layout as documented Section 5) will be further refined during the scoping and EIA phases to further minimise the effect of potential negative impacts and enhance positive impacts to ensure an environmentally sensitive and sustainable project is taken forward. Please also refer to Response 12 in Table 6.2 for more information on why the proposed use of natural resources is considered to be the best use thereof.
3. Would the approval of this application compromise the integrity of the existing approved Municipal IDP and SDF as agreed to by the relevant authorities?	No. The proposed development aligns with the Municipal IDP's which recognises the need for development of renewable energy and pursues economic development through renewable alternatives and promotion of energy efficiency. A focus group meeting was also undertaken with key stakeholders that included the municipalities, to involve them with the planning process and to better incorporate and communicate the stakeholder's views into the proposed development. No fatal flaws or issues compromising IDPs and SDFs have been raised by municipal representatives to date.
4. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in Environmental Management Framework (EMF)), and if so, can it be justified in terms of sustainability considerations?	No. Currently there is no EMF adopted by the Kouga Local Municipality. However, the Eastern Cape Biodiversity Conservation Plan (ECBCP), which sets out the land use objectives spatially, has been considered in the listed activities of the project. A screening exercise has also been undertaken with the specialists to identify and exclude No-Go areas from the proposed development footprint (see Section 5). These results will be refined even further as the EIA process progresses and more detailed specialist assessments become available.
5. How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural	As mentioned in Response 1, a screening exercise was undertaken to remove sensitive No-Go areas from the proposed layout area. Information on potential impacts related to natural and cultural areas are available in

areas (built and rural/ natural environment)?	Section 7 and will be assessed in detail during the EIA Phase according to the methodology proposed in Section 4.
6. How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?	Preliminary impacts were identified during the screening exercise and the results have been incorporated in the current proposed wind farm layout plan. The revised turbine layout has helped to reduce the siting of the proposed wind turbines in visually sensitive areas and recommendations have been provided to further reduce the visual impact where possible (see Section 7.12). Noise impacts to sensitive receptors were reduced originally through application of a 500 m buffer area around each potential receptor. Further mitigation to address residual impacts is addressed in Section 7. These impacts and mitigation measures will however be further assessed and refined during the EIA Phase in accordance with the methodology proposed in Section 4.
7. How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	A palaeontologist and archaeologist were appointed to undertake specialist investigations that would contribute towards the Screening, Pre-Application, and Scoping and EIA phases of the project. No-Go areas were identified during the screening phase, and have been avoided in the layout of the proposed infrastructure. The findings of these specialist assessments are complemented by previous heritage investigations undertaken in the area by the Eastern Cape Heritage Consultants, and the preliminary conditions of support from the Gamtkwa Khoisan Council, who have and will continue to be engaged with throughout this assessment process. In addition, the sensitive areas associated with the pre-colonial cultural landscape reported on by the Eastern Cape Heritage Consultants (Binneman and Reichert 2017) have also been avoided by the proposed development. For more detail on potential impacts related to heritage resources, please refer to Section 7.
8. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.	A detailed response will be provided during the EIA Phase once specialist studies have been completed. Please refer to Section 7 for information on anticipated potential impacts (including cumulative impacts set out in Section 8) which will be assessed in detail during the EIA Phase in accordance with the methodology proposed in Section 10.
9. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	The approach developed for this project is based on the precautionary principles of NEMA and have tried to avoid and minimise impacts as the most preferred form of mitigation, as identified through spatial plans, specialist desktop and site based research, and stakeholder engagement. However, all impacts cannot be avoided and these are therefore assessed as part of the scoping and EIA phases of the project with the support of specialist assessments. To minimise, manage and remedy the potential negative impacts, and enhance the positive impacts throughout the project cycle, mitigation measures are proposed and the details thereof will be included in an Environmental Management Programme in the EIA Phase. Furthermore, the Proponent is part of the Greater Kromme Stewardship which was established by a group of wind farms (Kouga, Jeffrey's Bay, Gibson Bay, Tsitsikamma Community, Oyster Bay Wind Farms and a wind farm developer called WKN Wind Current) and aims to identify and conserve important habitats and species found in the Kouga area where the wind farms operate, as well as secure ecological processes and ecosystem services.

7 Baseline environment and potential impacts

The description of the affected environment provided below draws primarily on the findings of the Specialist Studies undertaken to date (Appendices D1 to D10). These studies have in most cases been informed by existing knowledge from published data, previous studies, site visits including pre-construction site monitoring (where applicable) and field work undertaken in the broader study area for other projects, as well as discussions with various role-players specific to their discipline.

The identification of potential impacts which are expected to occur as a result of the proposed development activities, is broad, and covers the construction, operation, and decommissioning phases of the project. The sections below provide a brief introduction to the current baseline environment, site sensitivity and is followed by potential impacts and likely significance ratings, as well as proposed mitigation measures to reduce negative impacts or enhance positive impacts. Following this, the No-Go alternative is discussed. Each section concludes with a summary statement which provides the key findings and conclusions, as well as the way forward for the EIA phase is discussed.

The following environmental aspects are discussed in this Section:

- Climate
- Topography, geology and soils
- Terrestrial ecology
- Aquatic ecology
- Bats
- Avifauna
- Agriculture
- Socio-economics
- Palaeontology
- Archaeology
- Noise and shadow flicker
- Visual

7.1 Climate

Climate plays an important role in the technical feasibility of siting a wind farm. Additional climatic conditions also influence the rest of the environmental aspects indirectly and it is therefore necessary to consider these climatic conditions.

According to the Köppen-Geiger climate classification (Britannica, 2018), the site falls within the marine temperate climate region of South Africa which is characterised by frontal weather, leading to changeable often overcast and moderate weather conditions. The District municipal area's climatic conditions vary from mild with moderate rainfall along the coast to harsh conditions and low rainfall inland. The municipal area experiences an average summer temperature of 23°C, and a winter average of 17°C. The study area receives an average rainfall of up to 662 mm per annum (The World Bank Climate Change Knowledge Portal, 2018) with rainfall distributed throughout the year. The area is generally described as windy. Figure 7.1 illustrates the average temperatures and precipitation levels over a calendar year.

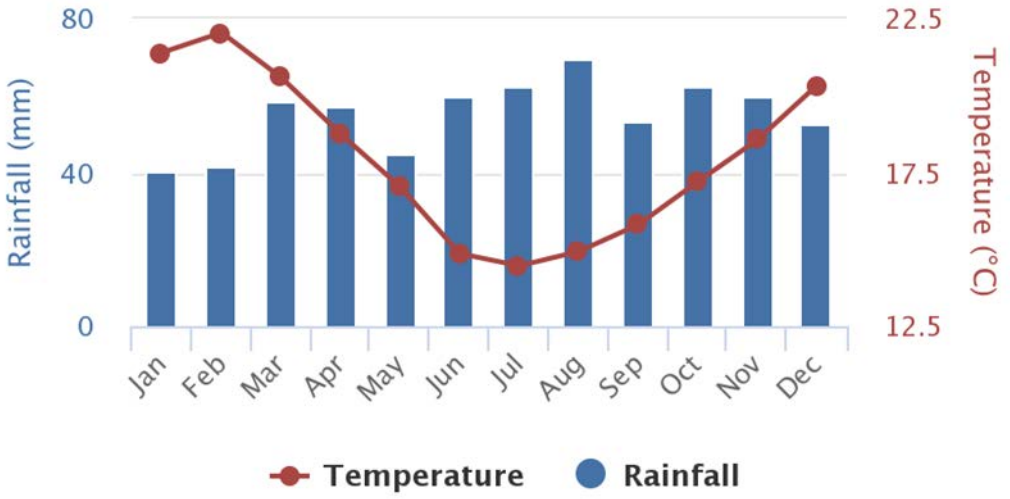

Figure 7.1: Average temperature and rainfall for Impofu West (The World Bank Climate Change Knowledge Portal, 2018*)*

In terms of wind direction, the wind rose for Oyster Bay (approximately 12 km away from the south-eastern extent of the site), shows how wind speed and direction in the area are distributed throughout the year. Figure 7.2 illustrates the dominant wind direction is from the west, with the contribution of the highest wind speeds from the west-north-west and to a lesser extent from the south.

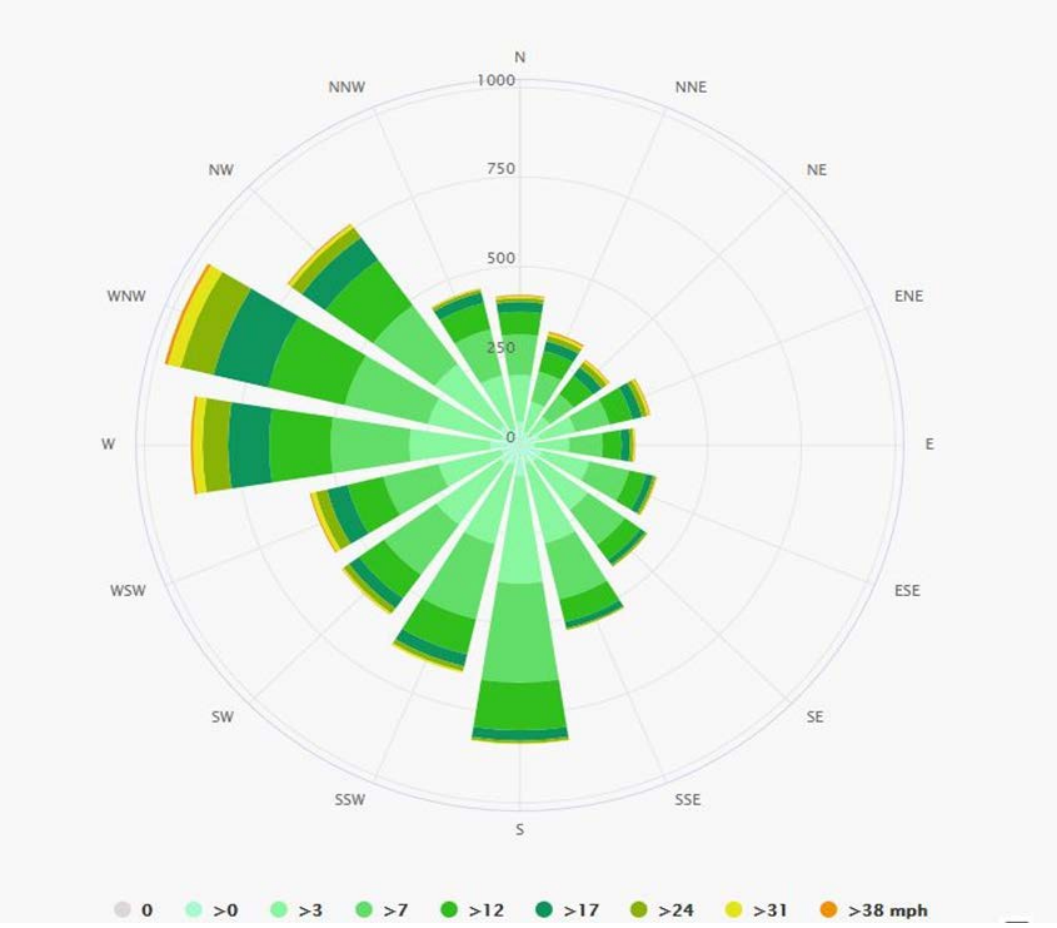

Figure 7.2: Wind rose for Oyster Bay (Enviroware, 2018)

7.2 Topography, geology and soils

The topography of the site is mostly flat and is mapped as having a slope of less than 5% but may be greater in a few isolated spots. The site terrain is located on coastal plains at altitudes between 180 and 250 m above sea level.

The underlying geology of the area as described by Lanz (2018) is characterised by Quarzitic Table Mountain Group sandstone with some influence of feldspathic sandstone and subordinate shale of the Table Mountain Group with shale and sandstone of the Bokkeveld Group (refer to Table 7.1).

The field soil investigation identified predominantly deep to moderately deep, very sandy soils with some drainage limitations. The soils of the study area have limited internal drainage in that saturation occurs within the soil profile for extended periods during the wet season (Lanz, 2018). The Impofu West site falls within three dominant land types, mainly Ha47, Bb75 and Ca80 land types. Soils of these land types comprise Constantia, Fernwood (Fw), Wasbank (Wa), Longlands (Lo), Houwhoek, Witfontein (Wf), Pinegrove (Pg), Kroonstad (Kd), Katspruit (Ka), Westleigh (We), Glencoe (Gc), Lamotte (Lt) and Clovelly soil forms. Refer to Figure 7.3 for a map of the land types on the site.

Table 7.1: Geological formations within the study area (Lanz, 2018)

Group	Formation	Lithology
Table Mountain Group	Sandstone	Grained quarzitic sands
Table Mountain Group	Subordinate shale	Feldspathic sands
Bokkeveld Group	Shale Sandstone	quartzites

The topography, geology and soils on site are of relevance to the agricultural potential of the site and the potential for palaeontological finds at the site. These specialist studies have been undertaken which will directly inform the design and turbine layout, thereby providing mitigation measures for any potential impacts where necessary. This is further discussed in Section 7.7 and Section 7.9, respectively.

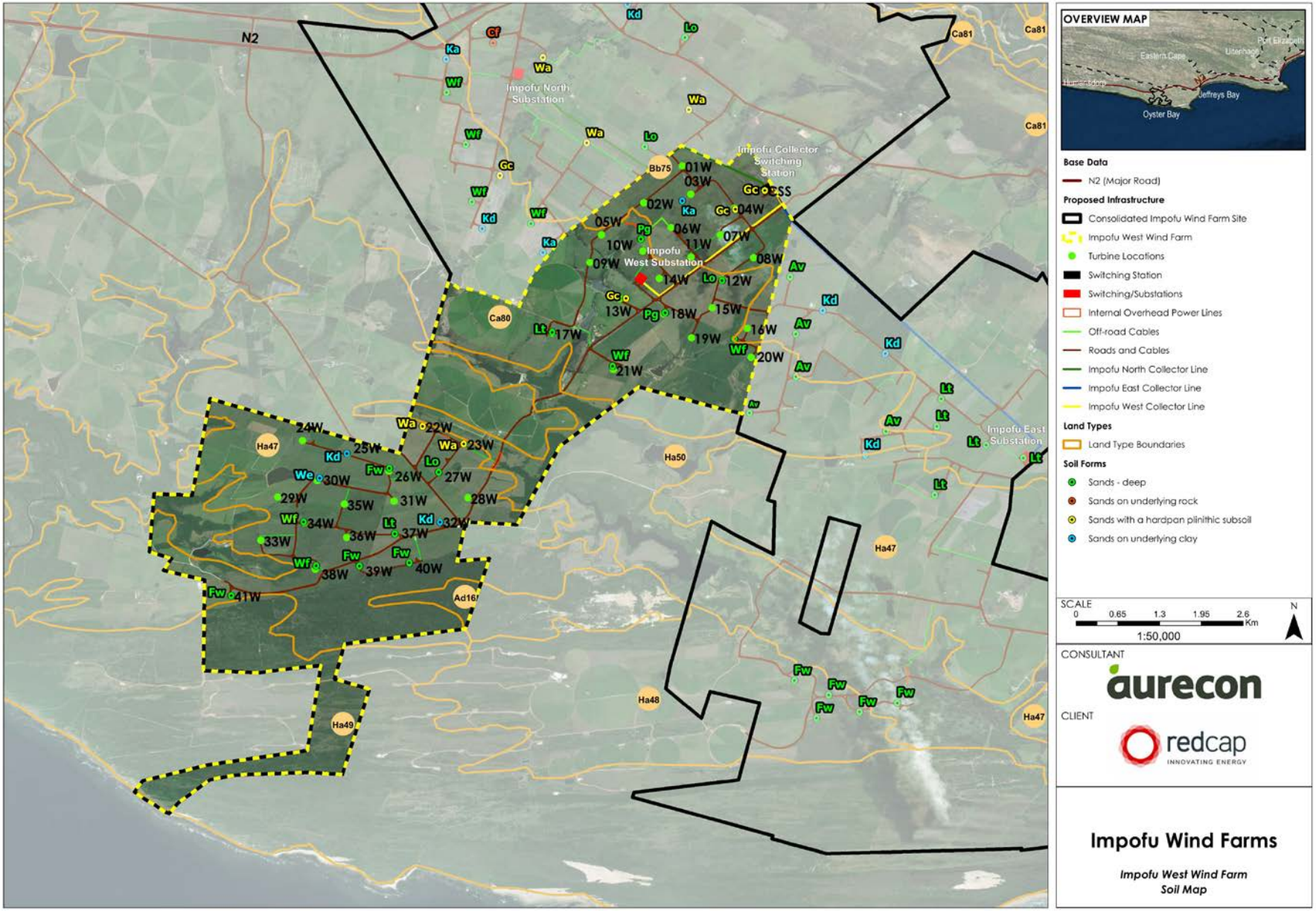

Figure 7.3: Land types and soil forms on the Impofu West site

7.3 Terrestrial ecology

Terrestrial ecology includes the floral and faunal components of the environment. Bats (refer to Section 7.5) and avifauna (birds) (refer to Section 7.6) have been excluded from this section and are dealt with separately due to the direct impacts experienced by the Wind Farm. Aquatic ecology has also been considered separately in Section 7.4.

The information included in this section is drawn from the Terrestrial Ecology Specialist Report attached as Appendix C1, undertaken by Mr. Simon Todd from Three Foxes Biodiversity Solutions (Todd, 2018).

7.3.1 Baseline description

7.3.1.1 Flora

According to the National Vegetation Map (Mucina and Rutherford, 2016) the majority of the site associated with the proposed Impofu West Wind Farm comprises mostly of Tsitsikamma Sandstone Fynbos with Southern Cape Dune Fynbos in the southern extent of the site (Figure 7.4). The ecologist also identified small patches of Southern Afrotemperate Forest in kloofs and other sheltered positions of the site. Some narrow bands of Eastern Coastal Shale Band Vegetation and Garden Route Shale Fynbos is indicated by the National Vegetation Map to traverse the site. However, according to the ecologist no intact portions of Eastern Coastal Shale Band Vegetation or Garden Route Shale Fynbos remains within the site as it appears to have been lost through agricultural transformation.

On a finer scale Vlok *et al*. (2008), as part of the Garden Route Initiative, indicates greater detail in terms of the mapping of the riparian vegetation and forest along the drainage lines of the broader area. In this regard, the site comprises of Kouga Mesic Proteoid Fynbos in the far north and Oyster Bay Thicket-Grassy Fynbos across the majority of the section of the site that represents plant communities of the greater Tsitsikamma Sandstone Fynbos vegetation unit (Figure 7.5).

Although the map by Vlok *et al.* (2008) provides greater detail than the National Vegetation Map, the current National List of Threatened Ecosystems relies largely on the aforementioned map and as such is the current underlying source of the legislation around threatened ecosystems. According to the National List of Threatened Ecosystems the following ecosystem status has been assigned to the vegetation units on the site:

- *Tsitsikamma Sandstone Fynbos*: Least Concern (LC). Relatively well conserved in the Garden Route National Park.
- *Southern Cape Dune Fynbos:* LC[6]. Significant proportion of the Western Cape part of this unit is conserved within the Goukamma Nature Reserve and in the Eastern Cape within the Huisklip Nature Reserve. This unit is also partly conserved within Thyspunt, Rebelsrus and Klasies River Cave.
- S*outhern Afrotemperate Forest:* LC. Many areas are conserved within the Garden Route National Park, Wilderness National Park and a variety of other protected forest areas.

[6] The STEP Programme identifies the affected area as consisting of the St Francis Dune Thicket habitat type which is listed as *Endangered* in terms of ecosystem status.

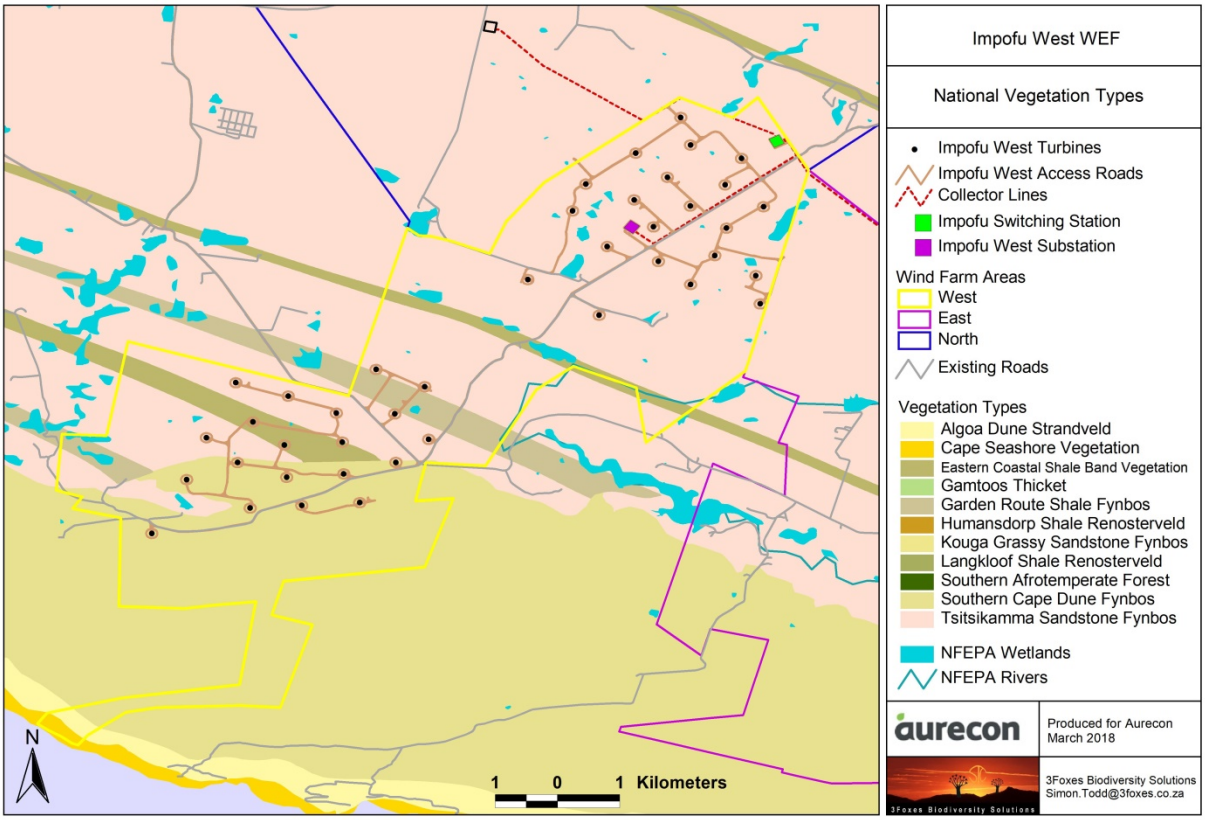

Figure 7.4: Vegetation map (Mucina and Rutherford 2006 and 2012 Powrie Update) of the Impofu West Wind Farm and surrounding area

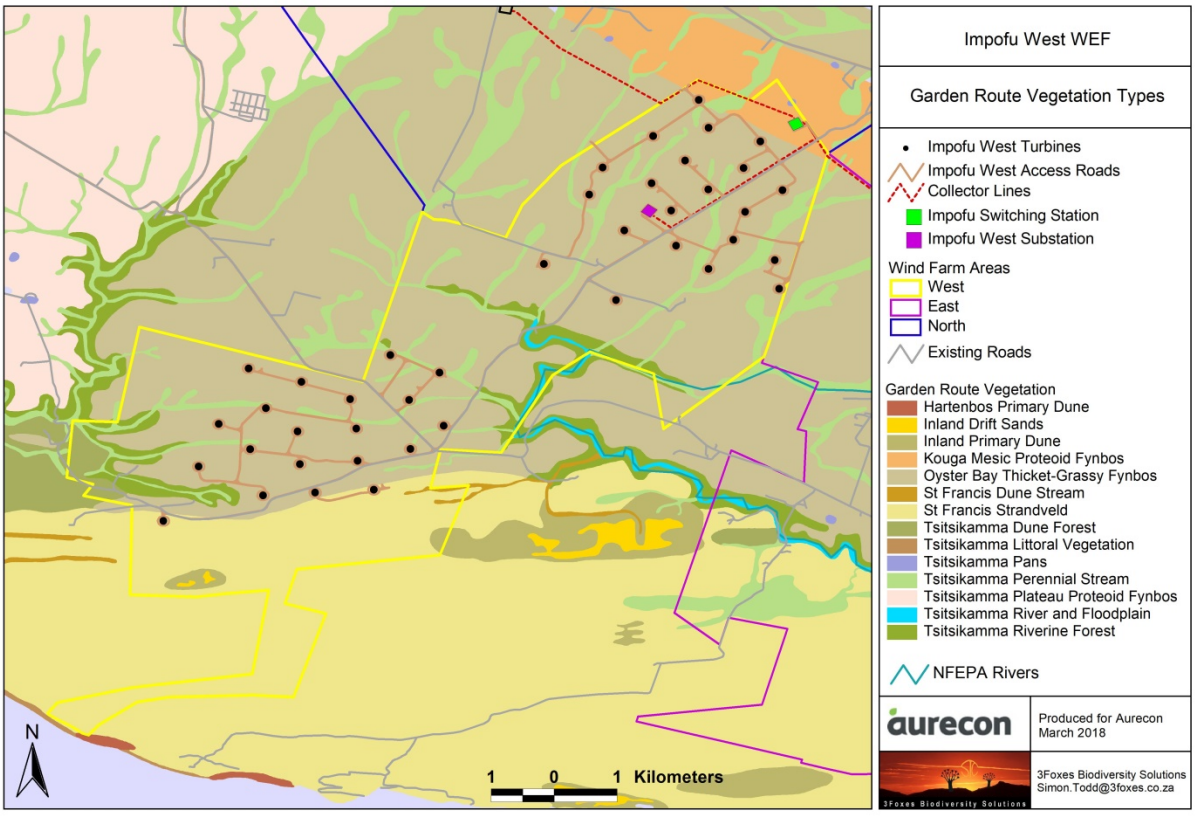

Figure 7.5: Extract of the vegetation map by Vlok *et al*. 2008 for the Garden Route Initiative

Although the National Vegetation Map provides a broad overview of the vegetation of the area in which the site is located, the map is not very informative or descriptive from a site-specific perspective. During his site inspection the terrestrial ecologist recognised a number of different plant units not mapped on the National Vegetation Map. A summary of the units identified on site and their ecological state is provided below.

Southern Cape Dune Fynbos

The southwestern margin of the Impofu West site consists of intact Southern Cape Dune Fynbos (Figure 7.6). This area includes various low dunes as well as the taller dunes along the boundary of the site and a series of wetlands in depressions between the dunes. This represents the only large contiguous area of intact habitat at the site and the majority of the areas south of the public road are considered highly sensitive. The areas in good condition have been classified as No-Go areas (refer to Figure 7.13) and are not considered suitable for development. However, there are also some areas that have been degraded around the margins of the intact area which are considered to be in a moderate to poor condition and are considered medium sensitivity where some development is considered acceptable.

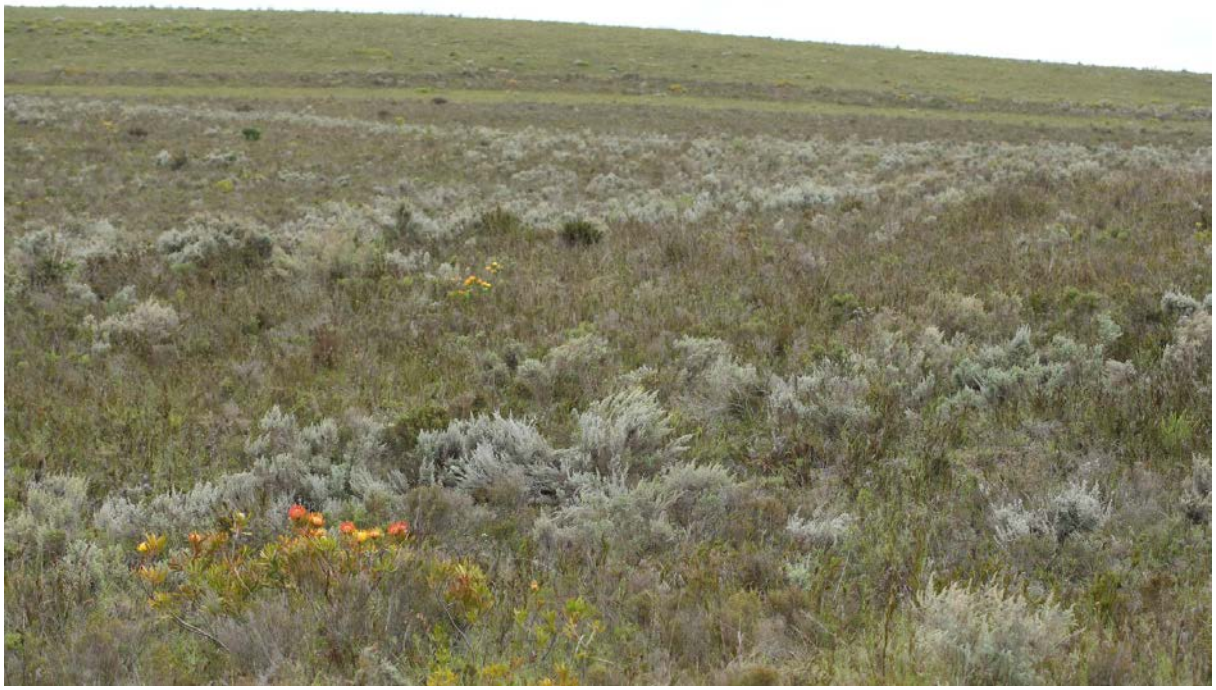

Figure 7.6: Showing one of the more disturbed areas of Southern Cape Dune Fynbos. The picture shows a high abundance of disturbance indicators such as *Stoebe plumose*

Tsitsikamma Sandstone Fynbos

Although the majority of the Impofu West site falls within the Tsitsikamma Sandstone Fynbos vegetation type, this unit has been significantly impacted by agricultural activities and there is very little intact Tsitsikamma Sandstone Fynbos remaining within the site. There are some remnant intact areas in the north of the site, but these are highly degraded as a result of overgrazing and poor fire management (Figure 7.7 and Figure 7.8). Species diversity of the degraded areas have dramatically been reduced through poor management. Alien plants as well as a high abundance of species indicating disturbance is present at these areas and are generally considered as medium sensitive. Wetlands located within these areas are still considered to be of high sensitivity. The degraded areas still play a role in terms of providing habitat for fauna and ecological functioning and although there are some turbines in these areas, this would not compromise overall ecological functioning and habitat value.

Figure 7.7: Highly degraded (grazing pressure and previously transformed) Tsitsikamma Sandstone Fynbos in the north of the Impofu West study area

Figure 7.8: Degraded remnant of Tsitsikamma Sandstone Fynbos located within croplands

Croplands, Pastures and Transformed Areas

A significant portion of the site comprises of croplands, pastures and previously ploughed areas used for livestock grazing (Figure 7.9). In general, these areas are of low value in terms of fauna and flora and not considered to be sensitive from an ecological perspective. The cropland areas and fields are used by some fauna for foraging but the significance of this remains low. Apart from the planted pasture species, common weedy and alien species present on the old pasture lands include *Pennisetum clandestinum*, *Eragrostis curvula*, *Plantago lanceolata*, *Cynodon dactylon*, *Conyza bonariensis*, *Seriphium plumosum* and *Pteridium aquilinum*.

Figure 7.9: The majority of the northern section of the Impofu West site has been transformed for croplands

Southern Afrotemperate Forest

There are numerous indigenous forest patches present across the site, associated with drainage lines, south-facing slopes and other moist or fire-protected habitats (Figure 7.10). These forest patches are often small and fragmented within croplands however they remain important habitat for a variety of fauna including the Blue Duiker *Philantomba monticola* which has been confirmed present on site. The forest patches have been classified as No-Go areas and as such excluded from the development footprint. However, some existing roads that would be used to access the site traverse through the forested areas and may need to be upgraded to facilitate movement of construction vehicles. The ecologist investigated these areas in the field and found no significant loss of intact forest habitat would occur in these areas.

Figure 7.10: Indigenous forest patches occur along drainage lines, on steeper slopes and wetter areas within the site; these areas are considered highly sensitive and considered to be No-Go areas

7.3.1.2 Fauna

Due to the transformed nature of the majority of the site, fewer mammals occur than would have naturally. According to the ecologist the site likely contains 50 naturally occurring mammals, however given the transformed nature of the site this number is likely to be significantly lower. The following species recorded or known to occur in the area are of conservation concern: African Striped Weasel *Poecilogale albinucha* (NT), Leopard *Panthera pardus* (VU), Cape Clawless Otter *Aonyx capensis* (NT) and Blue Duiker *Philantomba monticola* (VU). Blue Duiker occur in the forest patches (confirmed through camera traps) and it possible that Leopard may occur occasionally (not confirmed through camera traps). Significant habitat for mammals (e.g. forest patches, dunes and wetlands) have been avoided in the development footprint (Figure 7.11).

The site for the Impofu West Wind Farm has not been well sampled in the past for reptile biodiversity. Species known to occur (not observed as part of the ecological study) in the area that are of conservation importance include: Elandsberg Dwarf Chameleon *Bradypodion taeniabronchum* (EN), FitzSimons' Long-tailed Seps *Tetradactylus fitzsimonsi* (VU), and Karoo Padloper *Chersobius boulengeri* (NT). Intact Dune Fynbos in the south of the site, riparian areas, forest and thicket patches are the most suitable and important habitat for reptiles. These areas have been avoided in the proposed development footprint (Figure 7.11).

There are numerous earth dams, wetlands and drainage lines present at the site which represent the most important habitats for amphibians. Species observed at the site include Cape River Frog *Xenopus laevis*, Common Caco *Cacosternum boettgeri*, Bronze Caco *Cacosternum nanum* and Raucous Toad *Sclerophrys capensis*. Depressions and other wet features on the site can also provide habitat for less water dependent species like Cacos and Toads (Figure 7.11). These features have been well buffered in the proposed development footprint.

Figure 7.11: Examples of fauna found at the site, from left to right: Woodland Dormouse, Cross-Marked Grass Snake and Common Caco

7.3.1.3 Critical Biodiversity Areas

A large intact section (dune system that has been identified as a No-Go zone) in the southwest of the site is classified as CBA, whilst there are also numerous fragmented CBAs across the site (Figure 7.12). Several proposed turbine locations appear to be situated within these CBAs, however the ecologist confirmed via site visits (September 2017 and March 2018) that the majority of the areas, where turbines are located in CBAs, have undergone significant land-use changes since the CBA layers were created and these areas are now transformed. The underlying reasons for classifying these areas as CBA has been lost through transformation (agriculture) and they no longer carry significant biodiversity. The current layout was designed using an impact avoidance strategy and as a result sensitive and/or intact CBAs have been avoided to ensure a low impact.

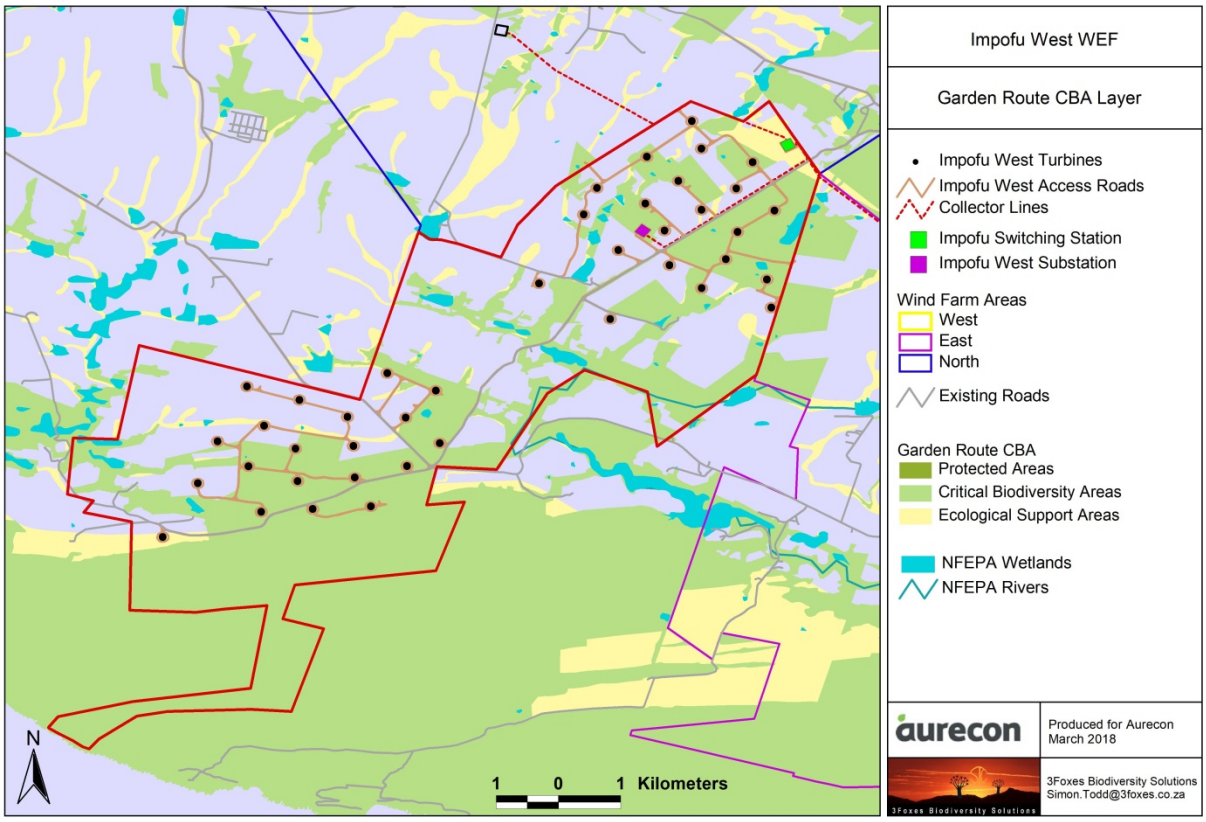

Figure 7.12: Critical Biodiversity Areas map for the Impofu West study area, showing the extensively transformed nature of the site apart from the intact dune area in the south

7.3.2 Site sensitivity

A sensitivity map that considers the ecological features of the site was developed (Figure 7.13). The high sensitivity areas have been avoided by the development footprint and there are no turbine locations in areas considered unsuitable for wind farm development. The intact Dune Fynbos in the south of the site was also identified as a highly sensitive area that is not considered suitable for development and has been mapped as a No-Go area.

All other high-sensitivity areas like forest patches and drainage systems in the west of the site have been avoided by the development footprint. The proposed access roads that do traverse these features are only along existing road alignments or through degraded areas and these have all been verified in the field as acceptable. This includes the proposed upgrades to two river crossings along the District Road 1774, which the ecologist has checked and verified. The proposed upgrades at these locations would not generate significant impact to the terrestrial environment.

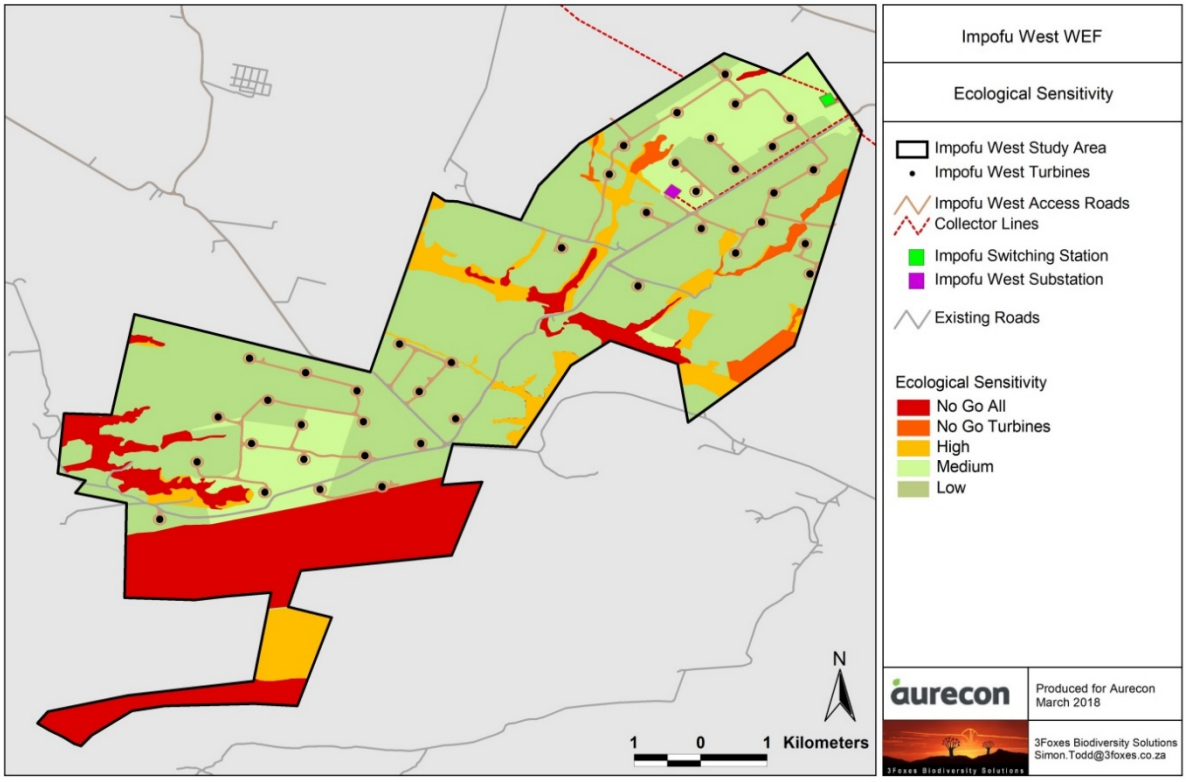

Figure 7.13: Sensitivity map of the Impofu West Wind Farm

7.3.3 Potential impacts

Several ecological impacts, on fauna and flora, have been identified by the ecological specialist and are largely associated with the loss of currently intact ecological habitat and the transformation of these areas. It is conservatively estimated by the ecologist that less than 5 ha of the Tsitsikamma Sandstone Fynbos vegetation type will be lost as a result of the proposed wind farm, while the extent of habitat loss within the Southern Cape Dune Fynbos is estimated at less than 10 ha. The remaining footprint is located in previously disturbed land or agricultural land and not considered to have a significant value for most terrestrial biodiversity. The impacts of the proposed wind farm in terms of direct habitat loss and ecological patterns and processes are anticipated to be low.

Given that the current layout has been designed using an ‘impact avoidance’ strategy, it is anticipated that no fauna or flora on the site would be particularly impacted or vulnerable to the proposed wind farm. Mitigation measures proposed are additional to the avoidance strategy and will further reduce the likely impacts identified.

Species of conservation concern (SCC) across the site is relatively low and there is likely to be no significant risk to local populations of these species, other than the impact resulting from the loss of some intact natural vegetation. Rather than the turbines themselves, the major likely impact would be as a result of some of the access roads transecting through areas of natural vegetation. The following mitigation measures will likely reduce the impact from **moderate negative** to **minor negative**:

- Pre-construction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads.
- Minimise the development footprint as far as possible and rehabilitate disturbed areas after construction.

Construction of the proposed wind farm will result in a significant loss of habitat and impact both directly (destroyed or poaching) and indirectly (noise and disturbance) on fauna e.g. slow-moving reptiles or retiring species would likely not be able to escape construction. The presence of machinery and personnel during construction and operation may realise this impact and the following mitigation measures will likely ensure a **minor negative** impact will remain:

- Avoidance of identified areas of high fauna importance at the design stage (as achieved in the current layout).
- Search and rescue for reptiles and other vulnerable species before areas of intact vegetation are cleared.
- Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase.
- Environmental induction for all staff and contractors on site.

There are a number of turbine locations and access roads within CBAs and some habitat loss within these areas will occur. However, many of the areas classified as CBAs have been lost to transformation since the CBA map was developed. Development of the proposed wind farm within the CBAs and ecological support areas (ESAs) is therefore considered to be a largely compatible land use as the habitat in these areas is already transformed or highly degraded. As a result, the overall impact of the development on CBAs is likely to be low and there is an opportunity to improve the habitat quality in these areas to result in a positive impact through improved management and the implementation of mitigation measures. The implementation of the recommended mitigation measures listed below would likely change the impact rating from **moderate negative** to **minor positive**:

- Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in previously disturbed areas.
- Avoid impact to restricted and specialised habitats such as pans, wetlands and dune fields (achieved in the current layout).
- Alien clearing and continued management in and around those parts of the development footprint that are within natural to near-natural vegetation to improve habitat quality and limit further spread of alien plants.

Some sensitive fauna may be deterred by the presence of the turbines and noise they generate and access roads may also fragment the habitat of fauna which are unable or unwilling to traverse open areas. Species on site that are particularly vulnerable in this regard include golden moles, burrowing snakes and skinks. The significance of this impact is on-going but can be mitigated from **moderate negative** to **minor negative** through the following mitigation measures:

- Development of an Open Space Management Plan to inform the EMPr to favourably manage the facility and surrounding area for fauna.
- Limit access to the site for staff and contractors.
- Where appropriate, design roads and other infrastructure to minimise faunal impacts and allow fauna to pass through or underneath these features.
- No electrical fencing within 20 cm from the ground to allow tortoises to move through safely.

Decommissioning activities will likely require the use of heavy machinery during the removal of the infrastructure on site. This may impact on fauna in the area, and the significant disturbance at the site will encourage alien plant invasion. Several problem plant species already occur in the area and will quickly establish and dominate disturbed areas. These include: *Acacia cyclops*, *Acacia saligna*, *Acacia mearnsii*, *Hakea sericea* and *Pinus pinaster*. With the below mitigation measures the impact significance will remain **minor negative** (or avoided):

- Implement an alien plant management plan as part of the project budget for at least five years after decommissioning.
- Regular monitoring of alien plants within the disturbed areas for at least two years after decommissioning or until alien invasive plants are no longer a problem at the site.
- Alien plant clearing should use best practice methods for species concerned.
- Any potentially dangerous fauna such as snakes threatened by the decommissioning activities should be removed to a safe location prior to commencement of decommissioning activities.
- All hazardous material should be stored in the appropriate manner to prevent contamination of the site. All accidental spills should be cleaned up appropriately.
- Vehicles must adhere to low speed limits to avoid collision with slow moving species e.g. snakes and tortoises.
- No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped.
- Above ground infrastructure must be removed from the site. If it does not pose a risk, below ground infrastructure (e.g. cabling) can be left in place to minimise disturbance, however decommissioning must be in accordance with the facility's decommissioning and recycling plan.

7.3.4 No-Go alternative

The No-Go alternative anticipates the current land use at the proposed site would continue and the wind farm development would not go ahead and current trends in land-use will likely continue. This includes a continued transformation of intact vegetation to pastures or croplands or further degradation because of alien plant infestation and poor fire and grazing management. The No-Go alternative is almost certain to result in long-term negative impacts on biodiversity, given the land-use trends apparent in the area. While the wind farm development presents an opportunity to work with the Greater Kromme Stewardship Initiative on a sustainable basis to identify critical areas that can be targeted for conservation.

7.3.5 Conclusion and recommendations

Although the Impofu West Wind Farm development is in the Scoping Phase, the current study is based on several site visits and detailed field assessment, with the result that the impact assessment and sensitivity map presented herein are based on detailed on-site information and as such have a high degree of confidence. Therefore, the potential impacts identified above are residual impacts after avoidance measures have been implemented.

Negative impacts associated with the proposed wind farm can likely be mitigated to low levels and residual impacts are considered acceptable. Negative impacts can further be reduced and long-term positive biodiversity outcomes will likely be realised through a contribution to the development of the Greater Kromme Stewardship Initiative as well as improved management of intact habitat in the areas surrounding the development footprint. The development proposal contains no fatal flaws and will likely have no high rated impacts post mitigation. During the EIA phase the final layouts will be assessed and appropriate recommendations to minimise or avoid impacts will be finalised.

7.4 Aquatic ecology

The information included in this section is drawn from the Aquatic Ecology Specialist Report attached as Appendix C2, undertaken by Dr. Brian Colloty of Sherman Colloty and Associates (Colloty, 2018).

7.4.1 Baseline description

The project falls within the K80E, K80F and K90D quaternary catchments within the South Eastern Coastal Belt Ecoregion located within the Mzimvubu-Tsitsikamma Water Management Area (WMA7).

Aquatic features on the site have been identified based on field work and monitoring activities undertaken by Colloty (2017) as well as a number of other sources including; the National Freshwater Ecosystem Priority Areas (NFEPA) project wetland mapping; best practice methods developed in conjunction with other wetland and aquatic specialists and the Department of Water and Sanitation (DWS) and assessment criteria contained in the DWAF (2005/2007) delineation manuals and the Wetland Classification System. These aquatic features are described below and mapped in Figure 7.14. The description includes an opinion of their respective Present Ecological Status (PES), Ecological Importance and Ecological Sensitivity which has been established through the application of accepted methodologies (as described in Colloty, 2018).

The site is characterised by perennial, non-perennial watercourses and drainage lines associated with the Tsitsikamma River, Klipdrift River and Krom River. These watercourses do not have clearly defined beds or banks and only carries water during or immediately after periods of heavy rainfall. All of the watercourses and drainage lines within the Impofu West Wind Farm have been assigned a condition score ranging from C to D (Nel *et al*. 2011), indicating that they are moderately to largely modified but with some biological significance. This is largely due to the high degree of transformation that has taken place within the catchments of these systems through to conversion of the natural fynbos to pasture for agricultural purposes.

According to the NFEPA wetland data and the National Wetland Inventory Data, several wetland types occur within the study area. These wetlands are classified as valley bottom wetlands, both channelled and unchanneled, endorheic pans, depressions and artificial to man-made systems such as dams, reservoirs and irrigation balancing dams. Goods and services provided by wetlands on site include maintenance of biodiversity and water supply for irrigation. The wetlands on site are considered by Colloty (2018) to be modified, with either small or narrow riparian zones. This can be attributed to the agricultural activities and irrigation that dominates the site.

According to Colloty (2018), the Present Ecological State of a river or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES for the drainage lines and the rivers in the Impofu West Wind Farm study area were rated as follows (DWS, 2014 – where D = Largely Modified and C = Moderately Modified):

Table 7.2: PES for the Impofu West Wind Farm

Sub-quaternary catchment number	Present Ecological State	Ecological importance	Ecological sensitivity
9127	D	Moderate	Medium
9201	D	Medium	High
9152	C	High	High

Based on the aquatic ecology study, it is evident that the aquatic systems within the study area are largely functional but are impacted upon due to the current agricultural land use practices. Impacts to these systems are mostly associated with conversion of the natural landscape to grazing, livestock trampling, and the large number of farm dams and alien tree infestation (*Acacia* species).

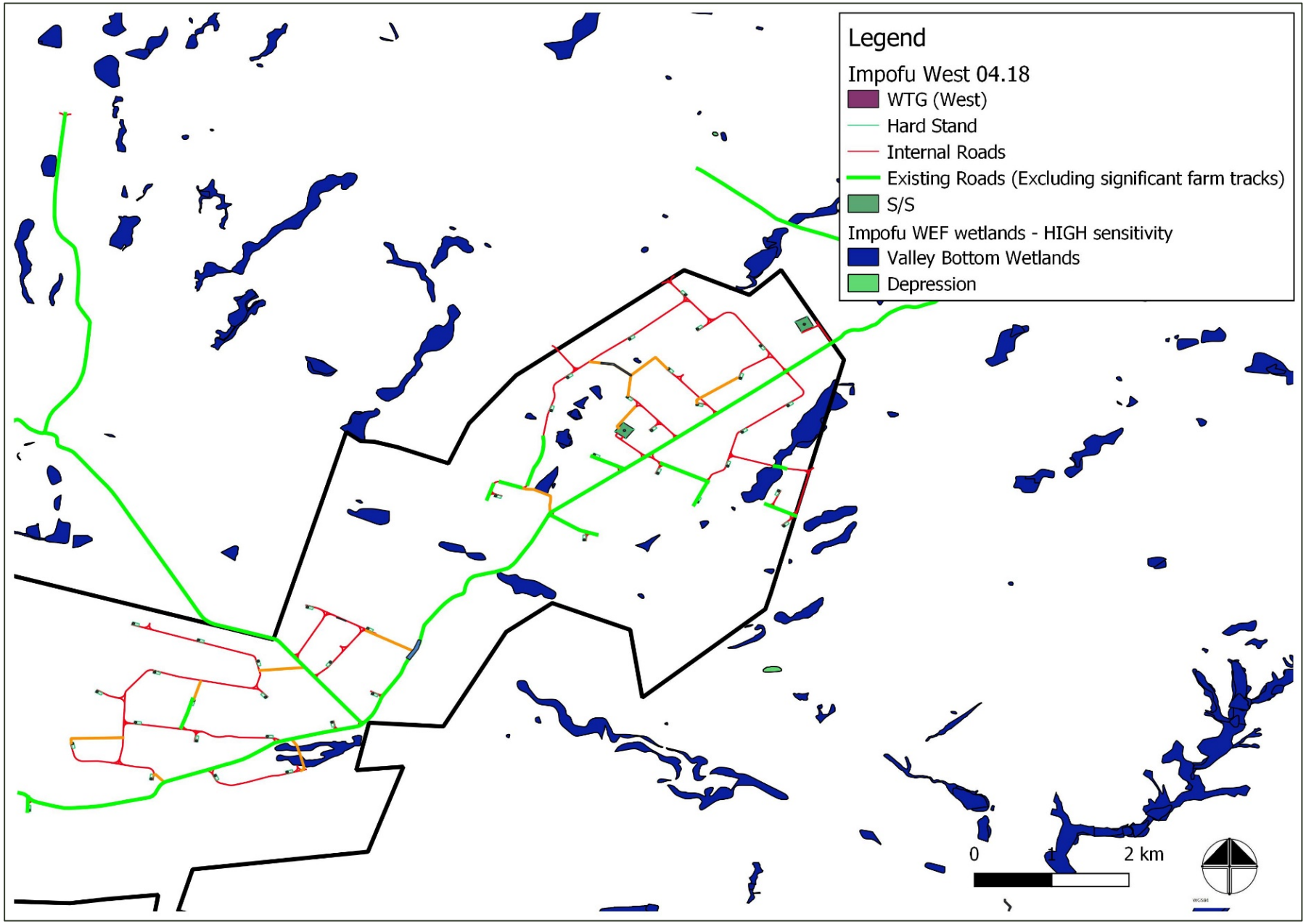

Figure 7.14: Watercourses that characterise the Impofu West Wind Farm site

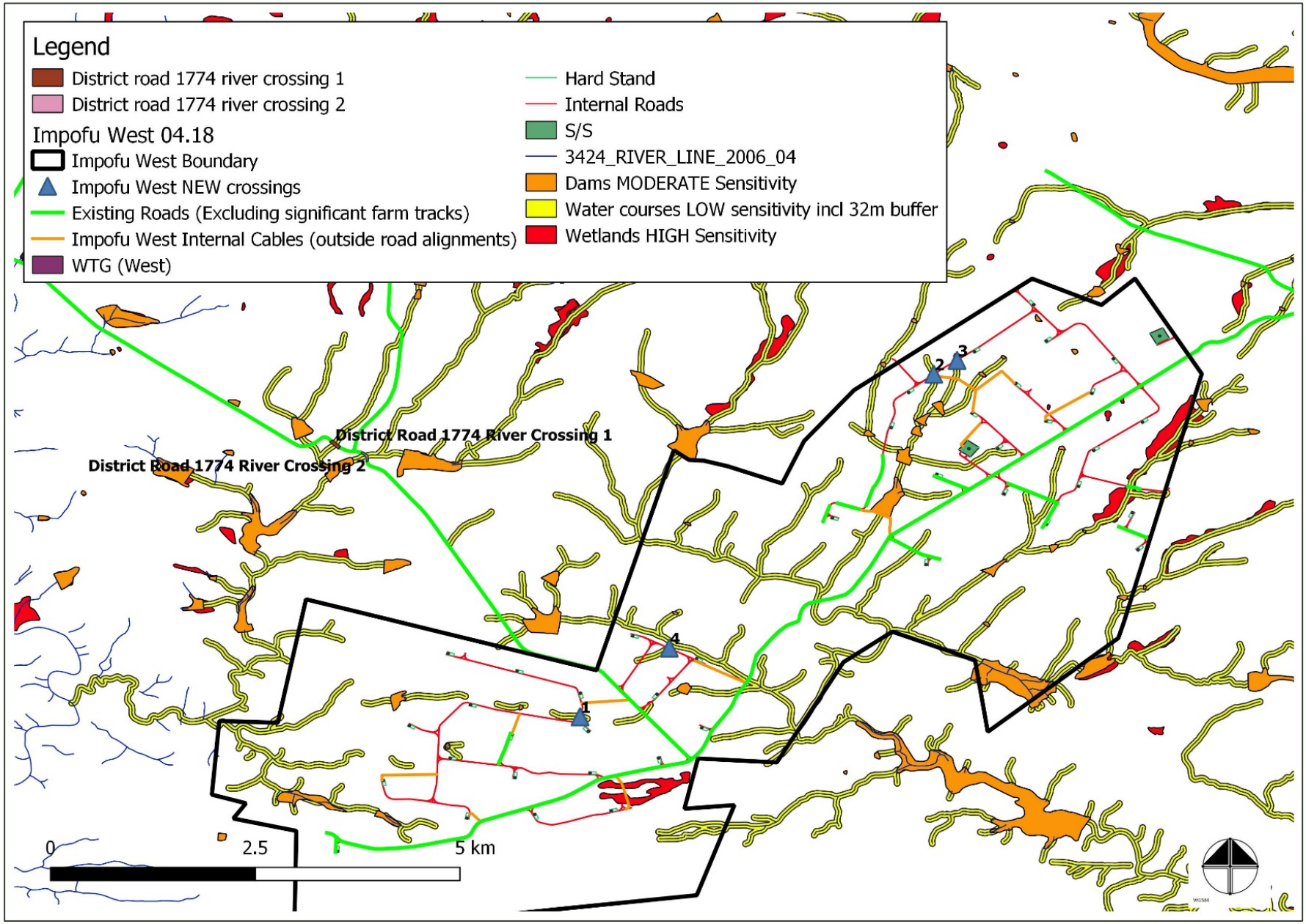

Figure 7.15: Aquatic sensitivity map for the Impofu West Wind Farm site, with the four crossings indicated with blue triangles plus the two on DR01774

7.4.2 Site sensitivity

Aquatic ecology sensitivity is directly related to aquatic species of special concern, riverine and wetland habitat and riparian systems and watercourses (refer to Figure 7.14). This is because a negative impact on aquatic features of higher ecological importance and sensitivity is more detrimental than the same impact on areas of low ecological importance and sensitivity.

Through site visits it was confirmed that the aquatic features on site are mostly functional although they are impacted upon by agricultural activities. This was verified for each of the affected reaches located within the development footprint and in particular the areas that would be crossed by the proposed road layout shown in Figure 7.15 (four river crossings plus the two proposed on DR01774). Although the systems observed are modified (PES scores of C and D), with either small or narrow riparian zones, or associated with Valley Bottom (Channelled or Unchannelled) wetlands. The Ecological Importance and Ecological Sensitivity ratings for these systems, was rated medium or high, respectively, based on the presence of the high number of wetlands within the broader study area (Table 7.2).

7.4.3 Potential impacts

The predicted aquatic ecology impacts that could potentially result from the proposed construction and operation of the proposed Impofu West Wind Farm and associated infrastructure are specifically in relation to the loss of aquatic species of concern and the loss of natural wetlands. All impacts to aquatic ecology are likely to occur during the construction and operation phases of the proposed development.

During the construction phase vegetation near or within watercourses will be disturbed which may contain species of special concern. It should be noted that various species, including *Eulophia* (orchids) and *Sideroxylon inerme* (Milkwoods) protected under the Provincial Nature Conservation Ordinance (PNCO) and National Forestry Act (NFA), occur on site. Due to the state of the current systems and the proposed localities of the river crossings and road upgrades, this impact is likely to be of **minor negative** significance pre-mitigation and can be mitigated to **negligible negative** if the following mitigation measures are applied:

- A final pre-construction walkdown should be conducted, as part of a Plant Search and Rescue plan, with the appropriate permits in place.
- All alien plant re-growth, which is currently high within the greater region must be monitored and should it occur, these plants should be eradicated within the project footprint and especially in areas near the proposed crossings. The scale of the operation does however, not warrant the use of a Landscape Architect and / or Landscape Contractor.
- Where any road crossings will be upgraded, construction should take cognisance of the following:
  - All pipe culverts must be removed and replaced with suitably sized box culverts, where road levels are raised.
  - River levels, regardless of the current state of the river / watercourse will be reinstated thus preventing any impoundments from being formed.
  - Approach road embankments especially where large cut and fill areas will be required must be rehabilitated during the construction process, to minimise erosion.
  - Suitable stormwater management systems must be installed and monitored during the first few months of use. Any erosion / sedimentation must be prevented.
  - If any of the delineated wetlands occur within 50 m of the existing crossings, then a detailed monitoring plan must be developed.
- Obtain appropriate permits from DEDEAT and DAFF prior to disturbing/removing plants of special concern.

The construction of the Impofu West Wind Farm, could potentially result in the loss of high sensitivity functional wetlands and riparian systems and watercourses that provide ecosystem services within the site and/or any required access road upgrades. Construction activities may also impact on aquatic features and localised water

quality. This may include spills during transport or while works are conducted within any watercourses resulting in potential impacts on the surrounding biota. These impacts can be mitigated from **minor negative** to **negligible negative** significance, and mitigation measures include:

- In the layout planning, avoid sensitive areas or cross such areas using existing tracks or road and cattle walkways (implemented in the current layout).
- Conduct a post-authorisation site walkdown to assist in developing a stormwater management plan, and wetland rehabilitation and monitoring plan.
- All alien plant re-growth, which is currently high within the greater region must be monitored and should it occur, these plants should be eradicated within the project footprint and especially in areas near the proposed crossings.
- Where any road crossings will be upgraded, construction should take cognisance of the following:
  - All pipe culverts must be removed and replaced with suitably sized box culverts, where road levels are raised.
  - River levels, regardless of the current state of the river / watercourse will be reinstated thus preventing any impoundments from being formed.
  - Approach road embankments especially where large cut and fill areas will be required must be rehabilitated during the construction process, to minimise erosion.
  - Suitable stormwater management systems must be installed and monitored during the first few months of use. Any erosion / sedimentation must be prevented.
  - If any of the delineated wetlands occur within 50 m of the existing crossings, then a detailed monitoring plan must be developed.
- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid the spread of any contamination.
- Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion.
- Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel.
- All construction camps, lay down areas, batching plants or areas and any stores should be more than 50 m from any demarcated watercourses.
- Chemicals used for construction must be stored safely on site and surrounded by bunds.
- Chemical storage containers must be regularly inspected so that any leaks are detected early.
- Littering and contamination of water sources during construction must be prevented by effective construction camp management.
- Emergency plans must be in place in case of spillages onto road surfaces and watercourses.
- No stockpiling should take place within a watercourse.
- All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
- Stockpiles must be located away from river channels.

During operation the increase in hard surface areas, and roads that require stormwater management will increase the concentration of surface water flows. These higher volume flows, with increased velocity could potentially result in downstream erosion and sedimentation. The impact can be mitigated from **minor negative** to **negligible negative** significance, and measures to mitigate erosion and sedimentation are as follows:

- A stormwater management plan must be developed post environmental authorisation, detailing the structures and actions that must be installed to prevent the increase of surface water flows directly into any natural systems. This must be inspected on an annual basis to ensure that the stormwater management plan is functional.
- Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks.

7.4.4 No-Go alternative

The No-Go alternative anticipates changes to the aquatic ecology environment that would occur in the absence of the proposed development. In this scenario, the No-Go alternative would result in the continuation of the current land use on site which is increasing in intensity within the region. The aquatic ecology investigation identified an increase in the number of irrigation pivots, or land being cleared or converted for grazing, thus continued clearing as well as other impacts such as water abstraction and changes to water quality (agricultural return flow), would be seen as a **high negative** impact significance in the region, as the number of wetlands would be lost, and changes to streams and rivers would increase, resulting in a deterioration of these systems over time. The potential for rehabilitation of wetland areas is particularly important with regard the No-Go alternative. Therefore, the anticipated impact of the No-Go scenario on the environment is negative, as the current negative land use activities will be maintained.

7.4.5 Conclusion and recommendations

Based on the aquatic assessment undertaken thus far, the proposed facility would have a limited impact on the aquatic environment as the structures will avoid the delineated natural wetlands (which delineation includes a 50 m buffer applied to each wetland), with a limited number of new watercourse crossings. The environmental assessment of the aquatic related impact shows negligible and minor impacts. However, the impacts can mostly be mitigated.

The primary negative impact is the loss of natural wetlands and aquatic habitat. In mitigating the negative impacts, the wind farm footprint has entirely avoided the delineated No-Go natural wetlands, identified at Screening and Iterative Design Phase. Thus, from an aquatic point of view no objection to the development taking place is made. This includes any of the four access roads that are indicated in the aquatic assessment, as well as the proposed two river crossings on DR01774 outside of the site boundary, together with the assumptions and mitigations presented by the specialist.

As the proposed project and associated activities have the potential to create erosion the following recommendations and assumptions are provided in addition to the mitigation measures listed in Section 7.4.3:

- Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.
- It is also advised that an ECO, with a good understanding of the local flora (or with access to a specialist with such understanding) 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, using selected species detailed in this report.

Furthermore, it is recommended that a comprehensive rehabilitation plan be implemented from the project onset within areas of disturbance (inclusion of buffers) to ensure a net benefit to the aquatic environment. During the EIA phase the aquatic ecology report will be updated to provide the details of the final delineation of any aquatic environments (if required), the updated and finalised PES, and Ecological Importance and Sensitivity scores for respective aquatic systems, as well as any updates to the impact assessment ratings and associated mitigation measures. These updates will be based on the final pre-construction site walkdown conducted in March 2018.

7.5 Bats

The information included in this section is drawn from the Bats Specialist Report attached as Appendix C3, including preliminary pre-construction bat monitoring results, undertaken by Mr Werner Marais of Animalia (Animalia, 2018).

7.5.1 Baseline description

The presence of bats in an environment is largely connected to areas providing roosting and foraging habitats. Vegetation types (described in Section 7.3), climatic and wind conditions (described in Section 7.1) are therefore

suitable indicators for potential roosting sites. The presence of watercourses (described in Section 7.4) and certain vegetation types providing insect habitat would be indicators of potential foraging sites. Adhering to the best practice guidelines, a 12 months monitoring schedule was initiated in November 2017 by the Bat specialist. The monitoring period will include seasonal site visits, representing all four seasons. The purpose of the monitoring period is to record data on bat species on site and bat foraging habitats on site. Of relevance to bat sensitivity is the land use, vegetation, climate and topography of the study area, as these factors influence possible roosting space, while climate can influence availability of food and insects.

There are various bat species in the vicinity of the site that are common in the area. Some of these bat species have been confirmed on site by the Bat specialist. According to Animalia (2018) some of these species on site are of special importance based on their likelihood of being impacted by the proposed wind farm, due to high abundances and certain behavioural traits. The relevant species are listed in Table 7.3 below. Based on the bat sensitivity report and pre-construction monitoring of the bat species recorded on site to date, the three most prominent species include the Egyptian free-tailed bat *Tadarida aegyptiaca*, the Cape serotine *Neoromicia capensis*, and the Natal long-fingered bat *Miniopterus natalensis* species.

These three species are most likely to be impacted by the proposed wind farm. The species are more abundant and are of a large value to the local ecosystems as they provide a greater contribution to most ecological services than the rarer species, due to their higher numbers. On the majority of recording systems, the passive data is showing *Tadarida aegyptiaca* to be the dominant species on site and especially at height, but with *Neoromicia capensis* dominating at short mast SM1 (34.125598°S, 24.498722°E) and SM3 (34.139070°S, 24.655086°E). In general bat activity at 97 m was significantly lower than at 10 m.

Approximately 11 km south-west of the site are approximately five caves situated near the Klasies river mouth, and two of them houses insectivorous bats and small numbers of fruit bats.

Table 7.3: Bat species confirmed on the Impofu West site

Scientific name	Common name	Conservation status (SANBI &EWT 2016)
Tadarida aegyptiaca	Egyptian free-tailed bat	Least Concern (2016 Regional Listing)
Neoromicia capensis	Cape serotine	Least Concern (2016 Regional Listing)
Miniopterus natalensis	Natal long-fingered bat	Near-Threatened (National Listing)
Eptesicus hottentotus	Long-tailed serotine	Least Concern (2016 Regional Listing)
Rhinolophus clivosus	Geoffroy's horseshoe bat	Near-Threatened (2004 National Listing)
Myotis tricolor	Temmink's myotis	Near-Threatened (2004 National Listing)
Pipistrellus hesperidus	Dusky pipistrelle	Least Concern (2016 Regional Listing)
Scotophilus dinganii	Yellow-bellied house bat	Least Concern (2016 Regional Listing)

7.5.2 Site sensitivity

Bat sensitivity is directly related to features identified as important for foraging and roosting for the bat species that most commonly occur on site, therefore site sensitivity is based on the species ecology and habitat preferences. Habitat preferences include irrigation centre pivots, wetlands and drainage lines. The foraging habitats and roosting sites (including the Klasies River coastal caves and the Tsitsikamma River Valley), including vegetation and open watercourses are considered to have a significant role for bat ecology.

A sensitivity map was drawn up prior to the Pre-Application phase of the project indicating potential roosting and foraging areas. The sensitivity map has been updated since the Pre-Application Phase of the project as the 12-month bat monitoring study has progressed. This has led to some turbines falling within the new No-Go areas. Some further turbine layout adjustments are thus required to accommodate the updated bat sensitivity map, which when done is likely to reduce the current significance rating for the anticipated impact of bat mortalities due to moving turbine blades (see Section 7.5.3). Refer to the amended sensitivity in Figure 7.14 and also the bat specialist report in this regard.

The High Bat Sensitivity areas are expected to have elevated levels of bat activity and support greater bat diversity. High Bat Sensitivity areas and their buffers (refer to Section 5.3) are No-Go areas due to expected

elevated rates of bat fatalities due to wind turbines. All of these No-Go areas were taken account of by the developer during the screening and iterative design phase of the wind farm layout and no turbines were originally proposed to be located within these High Sensitivity areas and their buffers. However, the specialist has updated the bat sensitivity mapping and at present 23 proposed turbines are within the High Sensitivity areas and corresponding buffers. 12 turbines are now proposed to be located within Moderate Sensitivity areas and corresponding buffers. As a result of the amendment to the sensitivity mapping, further turbine layout adjustments are required and will be assessed in the EIA phase of the project.

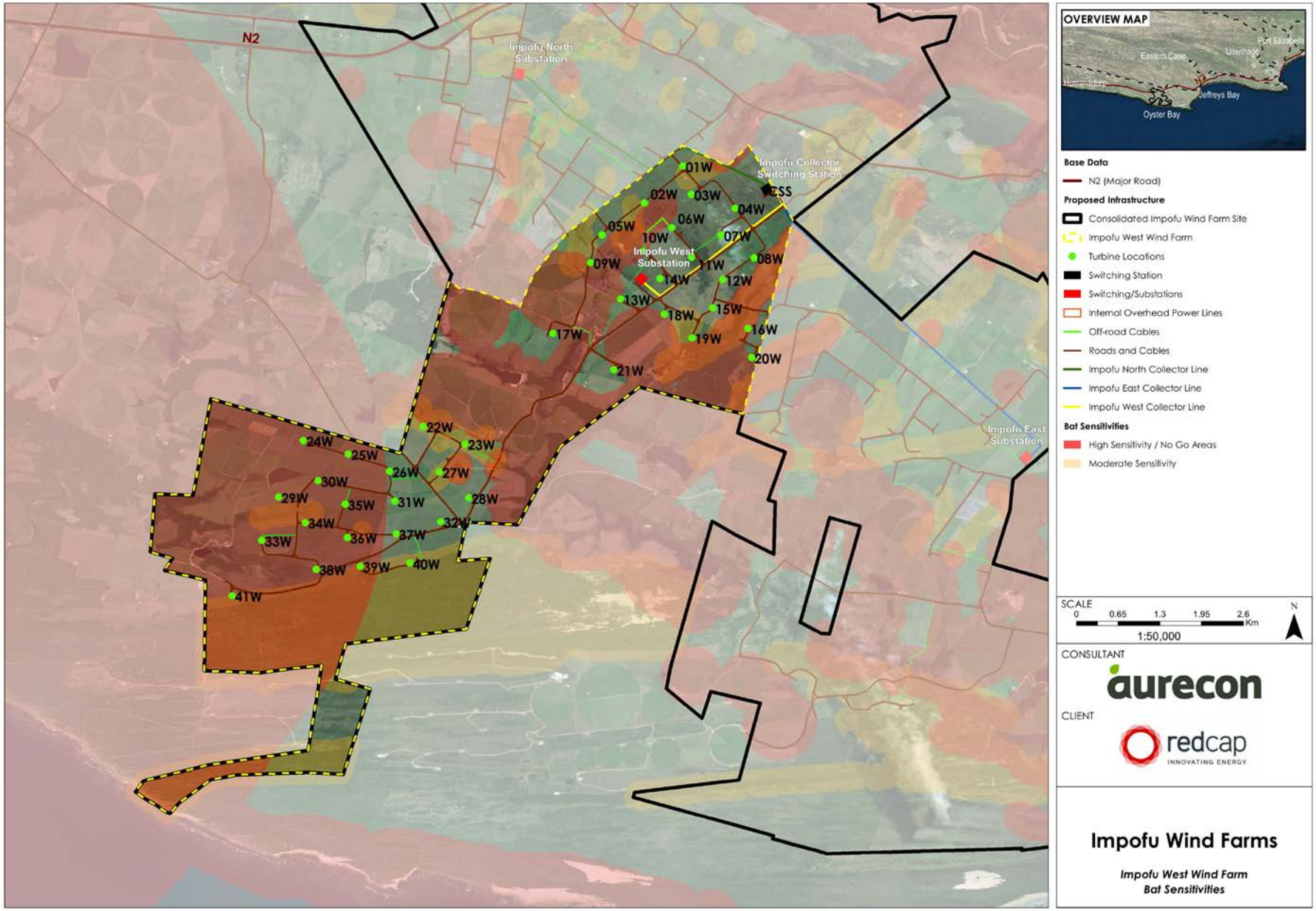

Figure 7.16: Impofu West bat sensitivity map, showing moderate (yellow) and high (red) sensitivity zones

7.5.3 Potential impacts

The impacts on bat sensitivity that could potentially result from the proposed construction and operation of the proposed Impofu West Wind Farm were specifically in relation to the potential increase of bat mortalities due to moving turbines and bat habitat destruction and disturbance. The impacts on bats are likely to occur during the construction and operation phases of the proposed development, with no significant impacts during decommissioning.

The clearance of vegetation during construction for wind farm associated infrastructure such as hardstands, roads, substations and laydown areas is likely to cause destruction of the very limited foraging habitat. However, this impact is not considered to have a significant effect on bat populations, due to the small percentage of the site that is likely to be transformed for turbines and associated infrastructure during construction. Based on the bat sensitivity investigation and proposed mitigations, the impact is likely to be of **negligible negative** significance pre- and post-mitigation. To mitigate the impact on habitat destruction, the following is recommended:

- Rehabilitate cleared vegetation where possible at areas such as temporary laydown areas.

Foraging and migrating bats are likely to be killed by the presence of moving wind turbine blades during the operational phase of the project, this happens either by direct impact or due to barotrauma. The Impofu West Wind Farm area indicates relatively high bat activity levels, especially of *Tadarida aegyptiaca*, which utilises higher airspaces and has the capability of foraging in higher wind speeds. Before the update to the bat sensitivity maps this impact was assessed as moderate, but based on the latest bat sensitivity maps, the impact is now assessed as **major significance**. This is due to the fact that the updated bat No-Go areas now include some of the proposed turbine locations. The mitigation that will have the biggest impact on reducing this significance rating is moving the turbines that are now situated in the new No-Go areas out of these areas. Other specific mitigation can only be recommended once the new layout is assessed and the full 12-month monitoring study is completed. Types of mitigation over and above moving the turbines could include:Turbine layout adjustments (significant adjustments already undertaken during screening), and where necessary reducing blade movement (curtailment) at selected turbines and high-risk bat activity times and weather conditions.

- Where necessary reducing blade movement (curtailment) at selected turbines and high-risk bat activity times and weather conditions.
- Operational monitoring to identify the level of impacts and whether additional mitigation measures are necessary.

The presence of security and operational lights used close to or on the wind turbines are likely to attract high insect numbers and thereby attract additional insectivorous bat activity. This is likely to increase the likelihood of impacts by turbine blades.. Based on the bat sensitivity investigation, the impact can be mitigated from **moderate negative** to **negligible** significance, with the main mitigation measure being:

- Only using lights with low sensitivity motion sensors, that can switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools.
- Ensure all lights are hooded.

7.5.4 No-Go alternative

The No-Go alternative assumes that the project is not developed and the proposed activity does not go ahead. In this scenario, the No-Go alternative will have no positive or negative effects on bat populations, as the environment will remain unchanged and *status quo* will be maintained.

7.5.5 Conclusion and recommendations

The Bats Specialist Report and initial pre-construction monitoring indicates that the bat species most likely to be impacted by the proposed Impofu West Wind Farm, are *Neoromicia capensis, Tadarida aegyptiaca* and *Miniopterus natalensis*. These more abundant species are of a large value to the local ecosystems as they

provide a greater contribution to ecological services than the rarer species, due to their higher numbers. These bat species have a conservation status of Least Concern (IUCN Red List, 2016 in Animalia, 2018).

The potential impacts on bat species are mostly related to increased bat mortalities as a result of the presence of wind turbines and destruction of bat habitats. The bat study has found that with the current turbine layout and the revised bat No-Go layers such impacts will have a major negative impact on bats in the study area, but the best way to reduce this impact is to move the turbines to outside the latest bat No-Go layers.

A 12 month pre-construction monitoring period and passive bat activity monitoring on the site remains the foremost means of identifying and assessing the potential impacts on bats. During the EIA phase the bat report will be updated based on the full and final 12 months of pre-construction monitoring, including recommendations with regards to the most appropriate mitigation and avoidance measures for the project. Additional analysis will be undertaken on the results from the pre-construction monitoring and passive bat activity monitoring to inform the cumulative impacts associated with the development.

7.6 Avifauna

The information included in this section is drawn from the Avifaunal Specialist Report, including the preliminary pre-construction bird monitoring results, attached as Appendix C3, undertaken by Mr. Jon Smallie of Wildskies Ecological Services (Wildskies, 2018). Based on the spatial location of bird flight records, the bird monitoring and avifaunal habitat in the Avifaunal Specialist Report is considered in terms of the Impofu Wind Farms consolidated site (comprising Impofu West, North and East), since birds are mobile this presents a stronger assessment, however, wind farm site specific mitigation measures are provided where relevant.

7.6.1 Baseline description

The proposed Impofu West Wind Farm study area consists of habitat which may sustain bird species likely to be impacted by the proposed wind farm. Adhering to the best practice guidelines, a 12 month monitoring schedule was initiated in June 2017 by an avifaunal specialist and has now been completed. The monitoring period included seasonal site visits, representing all four seasons. The purpose of the monitoring period is to record data on bird species on site and spatial patterns in bird flight movement. This seasonal sampling provided the specialist with the opportunity to undertake monitoring in summer (when summer migrants are present); winter (when raptors breed and Blue Cranes flock); spring (when summer migrants are arriving on site and many species start to breed); and autumn (when summer migrants are leaving and many raptors are preparing to breed).

The Kouga area is at the southernmost tip of the continent and bird migration routes, and the specialist therefore suggests that the area does not experience migration bottle necks of the type experienced elsewhere on the continent. This is supported by the absence of significant migration related fatalities at the nearby operational wind farms.

Of relevance to the avifaunal environment is the climate, vegetation and habitat of the study area. The Avifauna Specialist Report considered vegetation on the site with regards to potential bird micro-habitats (refer to Figure 7.17). A number of bird micro habitats are available to birds in the study area and these include: manmade dams, wetlands, rocky ridges, pasture/crops, Fynbos, exotic trees and thicket. As described in Section 7.3.1, the vegetation of the Impofu West Wind Farm is mapped as Tsitsikamma Sandstone Fynbos and Southern Cape Dune Fynbos, with small portions of Eastern Coastal Shale Band Vegetation and Garden Route Shale Renosterveld. The importance of this vegetation class from an avifaunal perspective is reduced by the very high level of transformation of vegetation in the study area as a result of the current agricultural land use activities such as pasture and crop production.

Figure 7.17: Typical micro-habitats available to birds in the Impofu Wind Farms study area

Based on the findings of the 12 month pre-construction monitoring, a total of 190 bird species have been recorded on the consolidated Impofu Wind Farms site, with a peak in species richness in summer (149), followed by spring (143), autumn (127) and winter (113). A total of 84 small terrestrial bird species were recorded on the consolidated Impofu Wind Farms site, from the site visits and 15 walked transects which were conducted (see the Avifaunal Specialist Report for the full data set). The most abundant small terrestrial bird species on site are species already known to be common in the area, such as; Cape Canary (*Serinus canicollis*), Barn Swallow (*Hirundo rustica*), African Pipit (*Anthus cinnamomeus*), Red-eyed Dove (*Streptopelia semitorquata*), Grey-backed Cisticola *(Cisticola subruficapilla)* and African Stonechat (*Saxicola torquatus*). Of the 84 recorded small terrestrial bird species on site none are regionally Red Listed[7] (Taylor *et al*, 2015) and nine are regionally endemic. Based on the Avifaunal investigation, this is a relatively low level of endemism, due to the current site

[7] Red Listed species refer to those that are categorised as being Threatened – either as Vulnerable, Endangered, or Critically Endangered.

activities and majority of the site being comprised of transformed habitat and therefore less likely to provide habitat for specialist bird species.

The endemic species recorded on site include: Cape Weaver (*Ploceus capensis*), Cape White-eye (*Zosterops virens*) Karoo Prinia (*Prinia maculosa*); Cape Grassbird (*Sphenoeacus afer*), Cape Bulbul (*Pycnonotus capensis*) Fiscal Flycatcher (*Sigelus silens*) Greater Double-collared Sunbird (*Cinnerys afer*), Sentinel Rock Thrush (*Monticola exploratory*) and Knysna Turaco (*Tauraco corythaix*). These endemic species are fairly represented in a variety of habitats. Species diversity indicated little seasonal variation, with a slight peak in spring of 53 species, followed by winter (52), autumn (51), and summer (49).

A total of 15 large terrestrial species and raptors were recorded on the Impofu Wind Farms site, from the site visit and the seven drive transects which were conducted (see the Avifaunal Specialist Report for the full data set). The most abundant species recorded on site is the White Stork (*Ciconia ciconia)*, which is most dominant in summer. The second most abundant species is Denham's Bustard (*Neotis denhami),* abundant in all four seasons, and is followed by the Jackal Buzzard (*Buteo rufofuscus)* which is also relatively high in abundance in all four seasons.

Nine priority bird species were classified for the assessment of the consolidated site and are listed in Table 7.4 below (the small bird community was not considered topmost priority). Priority bird species recorded on site are also identified as priority bird species for the broader Kouga area.

Table 7.4: Priority Bird species considered for assessment on the Impofu Wind Farms site

Scientific name	Common name	Conservation status
Neotis denhami	Denham's Bustard	Vulnerable regionally (Taylor *et al*., 2015) Near-threatened globally (IUCN, 2017)
Eupodotis senegalensis	White-bellied Korhaan	Vulnerable regionally (Taylor *et al*., 2015) Least concern globally (IUCN, 2017)
Anthropoides paradiseus	Blue Crane	Near-threatened regionally (Taylor *et al*., 2015) Vulnerable globally (IUCN, 2017) Endemic (almost entirely to SA)
Circus maurus	Black Harrier	Endangered regionally (Taylor *et al*., 2015) Endangered globally (IUCN, 2017) Near-endemic
Circus ranivorus	African Marsh-Harrier	Endangered (Taylor *et al*., 2015) Least concern globally (IUCN, 2017)
Polemaetus bellicosus	Martial Eagle	Endangered regionally (Taylor *et al*., 2015) Vulnerable globally (IUCN, 2017)
Haliaeetus vocifer	African Fish-Eagle	Least concern globally (IUCN, 2017)
Buteo rufofuscus	Jackal Buzzard	Least concern globally (IUCN, 2017) Endemic
Ciconia ciconia	White Stork	Least concern globally (IUCN, 2017)

The Secretarybird (*Sagittarius serpentarius)* is also one of the 15 large terrestrial species and raptors recorded on the consolidated site. Although it is one of the three large terrestrial regionally Red Listed species observed on the consolidated site, it is not considered a priority species for the assessment.

Twenty-one relevant bird species were recorded flying on the overall Impofu Wind Farms site. Six of these are regionally Red Listed and include: Martial Eagle (Endangered), Black Harrier (Endangered), African Marsh-Harrier (Endangered), Denham's Bustard (Vulnerable), Lanner Falcon (*Falco biarmicus*) (Vulnerable); and Blue Crane (Near-threatened).

The five most frequently recorded flying species on the consolidated Impofu Wind Farms site (in order of frequency) are: White Stork, Blue Crane, Denham's Bustard, Jackal Buzzard and African Marsh-Harrier. The flight activity recorded for the African Marsh-Harrier on the consolidated site is much higher than previously recorded elsewhere in the area. The flight paths of the five most frequent fliers are illustrated collectively on Figure 7.18. The flight activity recorded on the Impofu West site for the priority species is listed in Table 7.5.

Table 7.5: Flight activity recorded for the priority species on the Impofu Wind Farms site (the Impofu Winds Farms five most frequent fliers are bolded)

Common name	Number of flights on Impofu West	Mean height of recorded flights on the consolidated site
White Stork	**28 flight records on Impofu West in summer only**	**49.42 m above ground**
Blue Crane	**17 flight records on Impofu West**	**45.7 m above ground**
Denham's Bustard	**14 flight records on Impofu West**	**23.15 m above ground**
Jackal Buzzard	**34 flight records on Impofu West**	**60.68 m above ground**
African Marsh-Harrier	**17 flight records on Impofu West**	**15.03 m above ground**
African Fish-Eagle	Eight times	-
Martial Eagle	Three times	-
White-bellied Korhaan	Not recorded flying on Impofu West	-
Black Harrier	Not recorded flying on Impofu West	-

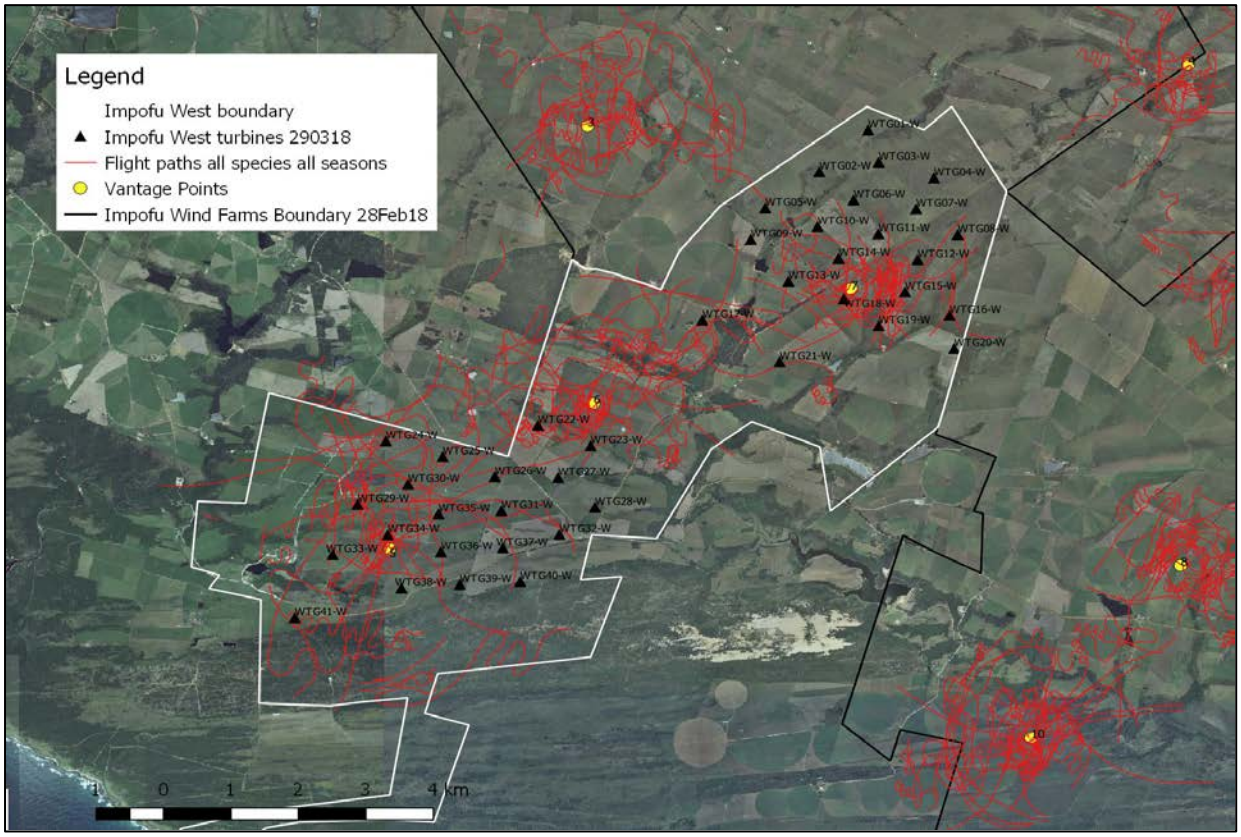

Figure 7.18: Recorded flight paths of most frequent fliers at Impofu West Wind Farm (all 5 species, 4 seasons)

A Martial Eagle nest is located on the northern side of the Impofu Dam as shown in Figure 7.19. The nest is located approximately 2 km north of the original Impofu Wind Farms site boundary. The presence of this nest has significant implications for the proposed development. To avoid risks to these eagles a 6 km radial buffer around the nest site was declared a No-Go area during the Iterative Design Phase, refer to Section 5.3(Site layout design).

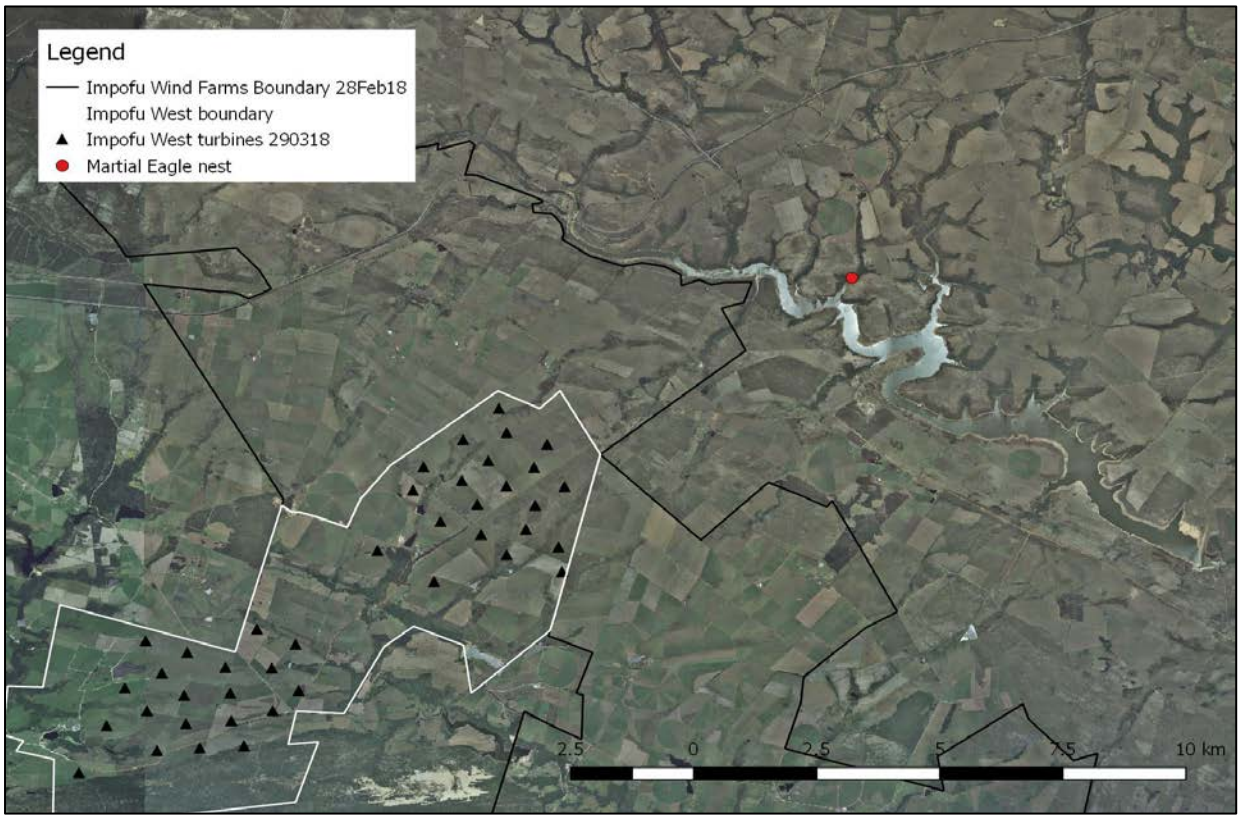

Figure 7.19: The location of the Martial Eagle nest in relation to the Impofu West Wind Farm (Wildskies,2018)

7.6.2 Site sensitivity

Avifaunal sensitivity is directly related to Important Bird and Biodiversity Areas (IBBA). According to Wildskies (2018) the Impofu West Wind Farm site falls between the lowest and second lowest sensitivity category in terms of avifauna, this is because the study area is not located in an IBBA. The closest IBBA's to the Impofu Wind Farms site are approximately 31 km north (Kouga-Baviaans) and 31 km west (Tsitsikamma National Park). On a national level, the broader Kouga area has been identified as an important area for three large terrestrial bird species, mainly the Blue Crane, Denham's Bustard, and White-bellied Korhaan (Van Rooyen and Froneman, 2013). With this in mind and based on the findings of the avifaunal investigation for the project, on the balance of predicted impacts, the Impofu West Wind Farm site falls in an area of Low to Moderate sensitivity on a national scale.

The on-site sensitivity for the consolidated site was assessed during the Screening and Iterative Design Phase and considered: wetlands and associated drainage lines/streams, dams, mini gorges, Fynbos/Renosterveld, and the Martial Eagle nest. All of these aspects were avoided during the Screening and Iterative Design Phase as shown in Figure 7.20.

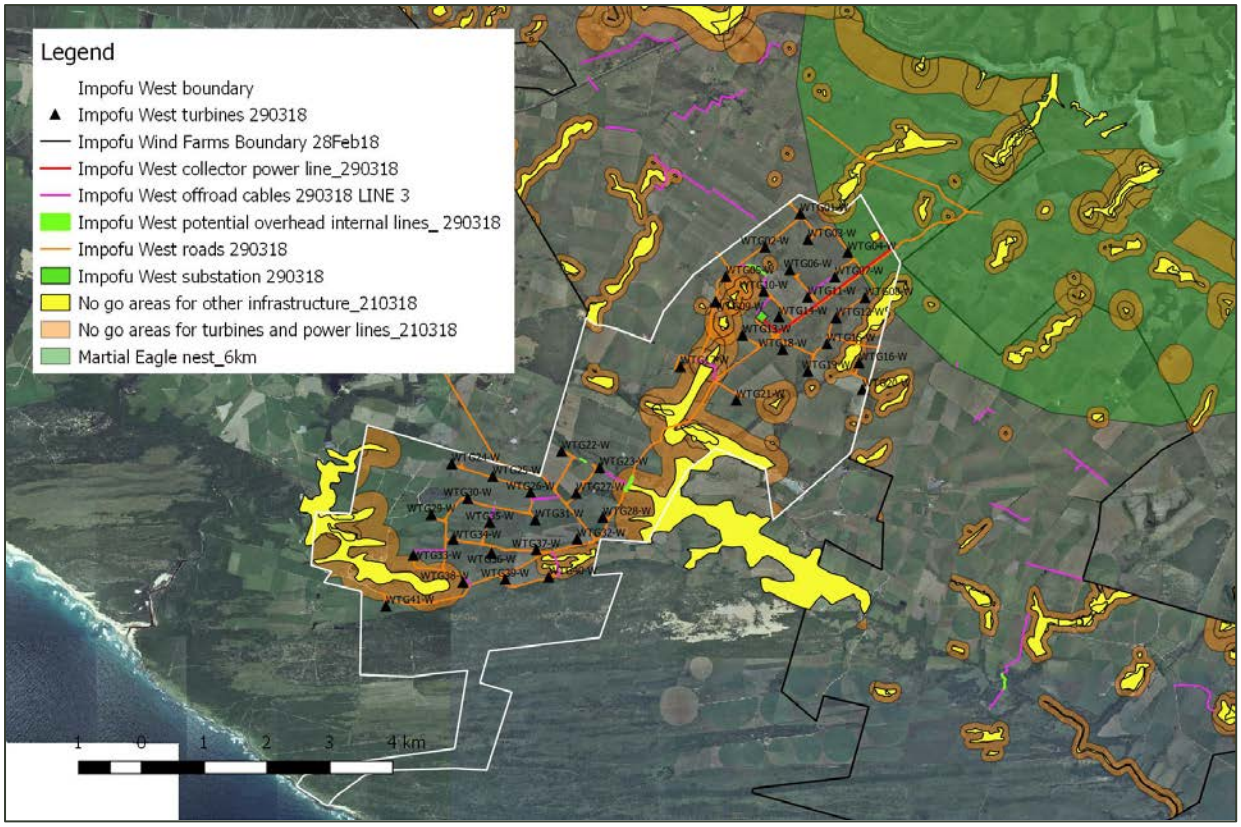

Figure 7.20: Avifaunal sensitivity map for the Impofu West Wind Farm (Wildskies, 2018)

7.6.3 Potential impacts

The impacts on avifauna that could potentially result from the proposed construction and operation of the proposed wind farm were specifically in relation to the potential increase of collisions with wind turbines which is a direct mortality factor, habitat destruction and disturbance as well as displacement and barrier effects presented by the wind turbines.

Based on the avifaunal investigation, the construction of the consolidated Impofu Wind Farms is likely to result in the loss of approximately 151.2 ha of land that will be transformed for roads, turbines, hard stands, switching substation and electrical cabling. At the Impofu West Wind Farm approximately 51.7 ha would be lost or transformed by the wind farm activities, areas that were previously available as bird habitats are likely to be transformed and will no longer be useful to bird species. Given the significance of arable land as a micro habitat for key bird species such as Denham's Bustard, Blue Crane, White-bellied Korhaan and White Stork makes this impact significant. The impact is likely to be of **minor-moderate negative** significance pre- and post-mitigation. The avifaunal specialist proposed the following mitigation measures for this impact:

- Avoiding sensitive bird habitats such as wetlands and dams, this mitigation measure has been adopted at screening phase and implemented in the initial turbine layout.
- An avifaunal walk down should be conducted to confirm the final turbine layout and identify any sensitivities that may arise between environmental authorisation and the construction phase.
- All construction activities should be strictly managed according to generally accepted environmental best practice standards, to avoid any unnecessary impact on the receiving environment.

The construction and operation of the Impofu West Wind Farm is likely to cause disturbance to bird species, breeding birds are likely to be disturbed by human, vehicle and machinery movement on site, including noise and vibrations. This is likely to result in reduced breeding productivity, breeding fails and abandonment of breeding bird sites. The avoidance measure of a 6 km buffer to protect the Martial Eagle nest and territory have

reduced the significance of this impact to **negligible negative** significance during construction. To mitigate the impact on disturbance of birds during construction the following is recommended:

- Monitoring of breeding status of Martial Eagles should be conducted in all breeding seasons post acceptance of the project as preferred bidder (to establish baseline) and including during and post construction.
- An avifaunal walk down should be conducted to confirm final turbine layout and identify any new sensitive species breeding sites.

The impact is of **minor negative significance** during operation and no mitigation is required.

The operation of the proposed Impofu West Wind Farm is likely to result in birds displaced from the site thereby losing areas for their foraging, roosting and breeding. Based on the avifaunal investigation and proposed mitigations, the impact is likely to be of **negligible negative** significance pre- and post-mitigation. To mitigate the impact on displacement of birds, the following is recommended:

- An avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between environmental authorisation and construction.
- Monitoring of breeding status of Martial Eagles should be conducted in all breeding seasons post construction.

The presence of wind turbines during the operational phase of the project, will likely lead to bird fatalities through collision with wind turbine blades. Due to bird flights which have been recorded within the height of the proposed wind turbines. The significance of this impact is **moderate negative** for six species: Denham's Bustard, Blue Crane, African Marsh-Harrier, Martial Eagle, Jackal Buzzard and White Stork. To mitigate the impact on bird collision, the following is recommended:

- An avifaunal walk down should be conducted to confirm the final layout and identify any sensitivities that may arise between environmental authorisation and construction.
- Provision for mitigation contingency budget for the operational phase should be made by the developer.
- If Blue Crane turbine or power line collision fatalities occur as a result of livestock feeding points once the facility is operational, this will need to be mitigated, probably by restricting farmers from feeding too close to turbines and power lines. Landowners should be made aware of this possibility at the outset of the project.
  Note: This mitigation is based on the fact that at an operational wind farm in the Overberg of the Western Cape, Blue Crane abundance on site is high, and the relatively low number of fatalities recorded indicates that the species may be fairly adept at avoiding turbine collisions.

The presence of wind farm associated infrastructure during operation, such as overhead powerlines and substation, will likely cause bird collisions and electrocution. Birds in flight collide with overhead cables and are likely to be killed or injured, birds perching on pylons are likely to be electrocuted or killed. The impact can be mitigated from **minor negative** to **negligible negative** significance. Proposed mitigation includes:

- An avifaunal walk down should be conducted to confirm the final layout and identify any new sensitivities.
- Overhead conductors or earth wires should be fitted with an Eskom approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions.
- Pylons or poles must be designed according to Eskom approved bird friendly designs to ensure that perching large birds cannot be electrocuted.

7.6.4 No-Go alternative

Should the proposed project not proceed, the current *status quo* will be maintained. No wind farm and associated infrastructure will be built on site. The impact of the No-Go alternative on the environment from an avifaunal perspective is low negative, none of the potential impacts on birds would take place.

7.6.5 Conclusion and recommendations

The findings of the Avifaunal investigation indicate that 84 small bird species are found on the consolidated Impofu Wind Farms site. None of these species are regionally Red Listed and nine are regionally endemic or near-endemic, with a relatively low level of endemism. Fifteen large terrestrial or raptor species were recorded on the consolidated Impofu Wind Farms site. Two species are endemic or near-endemic, which appears to be of low levels than elsewhere in the broader Kouga region. A Martial Eagle nest was found to the north of Impofu Dam, well off the Impofu West Wind Farm site, the avoidance measure of a 6 km buffer to protect the Martial Eagle nest and territory has been implemented in the turbine layout.

The potential impacts on avifauna are mostly related to increased bird and habitat destruction and risk of collision during operation. The Avifaunal investigation found that such impacts will either be moderate negative or negligible negative impact on avifauna in the study area. An avifaunal walk down of the site prior to construction along with the provision of a mitigation contingency budget for the operational phase remains the foremost means of mitigating the impacts on avifauna after the detailed site layout adjustments that were undertaken during the Screening and Iterative Design Phase. It is also recommended that the during construction and post construction monitoring programme outlined in Appendix 4 of the avifaunal specialist report be implemented according to the latest available version of the best practice guidelines at the time.

7.7 Agriculture

The information included in this section is drawn from the Agriculture Specialist Report attached as Appendix C5, undertaken by Mr Johann Lanz (Lanz, 2018).

7.7.1 Baseline description

The proposed site is dominated by agricultural activities. The site and surrounding areas are currently used for intensive, high production dairy farming with some areas of cultivated, kikuyu based pasture and additional fodder crops, both under irrigation, as well as non-irrigated. Due to the soils and climatic conditions of the site dairy farming is the most suitable agricultural land use. Agricultural activities adjacent to the site comprises of cultivated dairy farms. A small percentage of the area is also utilised for beef cattle farming. Due to the climatic conditions of the area, crops that are capable to grow in these conditions include macadamia nuts.

The project area has a land capability classification, according to the 8-category scale, of Class 3 which is moderate potential arable land. The investigated soils are rated as low agricultural potential due to the physical and chemical characteristics of a soil profile which pose limitations which constrain crop production. The soils of the study area are naturally very acidic requiring high inputs of lime for agricultural use, this limits their water and nutrient holding capacity.

Despite the limitations which constrain crop production and soil limitations, the agricultural environment (the combination of soils and climate) of the study area is highly suitable for intensive and productive dairy farming on kikuyu based pastures. Limitations on pasture cultivation are on patches of rock outcrop and associated shallow rock banks as well as areas constrained by topography such as river gorges and mountainous land.

In terms of agricultural potential, the site presents sufficient rainfall to support viable agricultural production of dryland fodder crops for dairy cows. Where dams are available, there is sufficient rainfall for water storage for irrigation purposes. Groundwater also serves as a source of water supply in the study area and is predominantly used for irrigation.

7.7.2 Site sensitivity

Agricultural sensitivity is directly related to the capability of the land for agricultural production, including production capability enabled by infrastructural and other agricultural improvements made to the land. This is because a negative impact on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability.

According to the agricultural study, the natural agricultural potential of the site is constant, except for limitations on the patches of rock outcrop that occur. The differences in agricultural production capability across the site are the result of the agricultural improvements that have been made. Irrigated land has a higher production capability than non-irrigated land, and it therefore has the highest agricultural sensitivity. The field investigation categorised the site agricultural sensitivity into four categories, low, moderate, high and No-Go based on significant agricultural sensitivity. Areas that are suitable for cultivation but with limitations were classified as moderate. Areas that are suitable for cultivation and could potentially be developed as irrigated land were classified as having high sensitivity. Centre pivot irrigated lands were classified as No-Go areas. The No-Go areas are shown in Figure 7.21 below. All No-Go areas have been considered and avoided in the current design layout of the proposed wind farm.

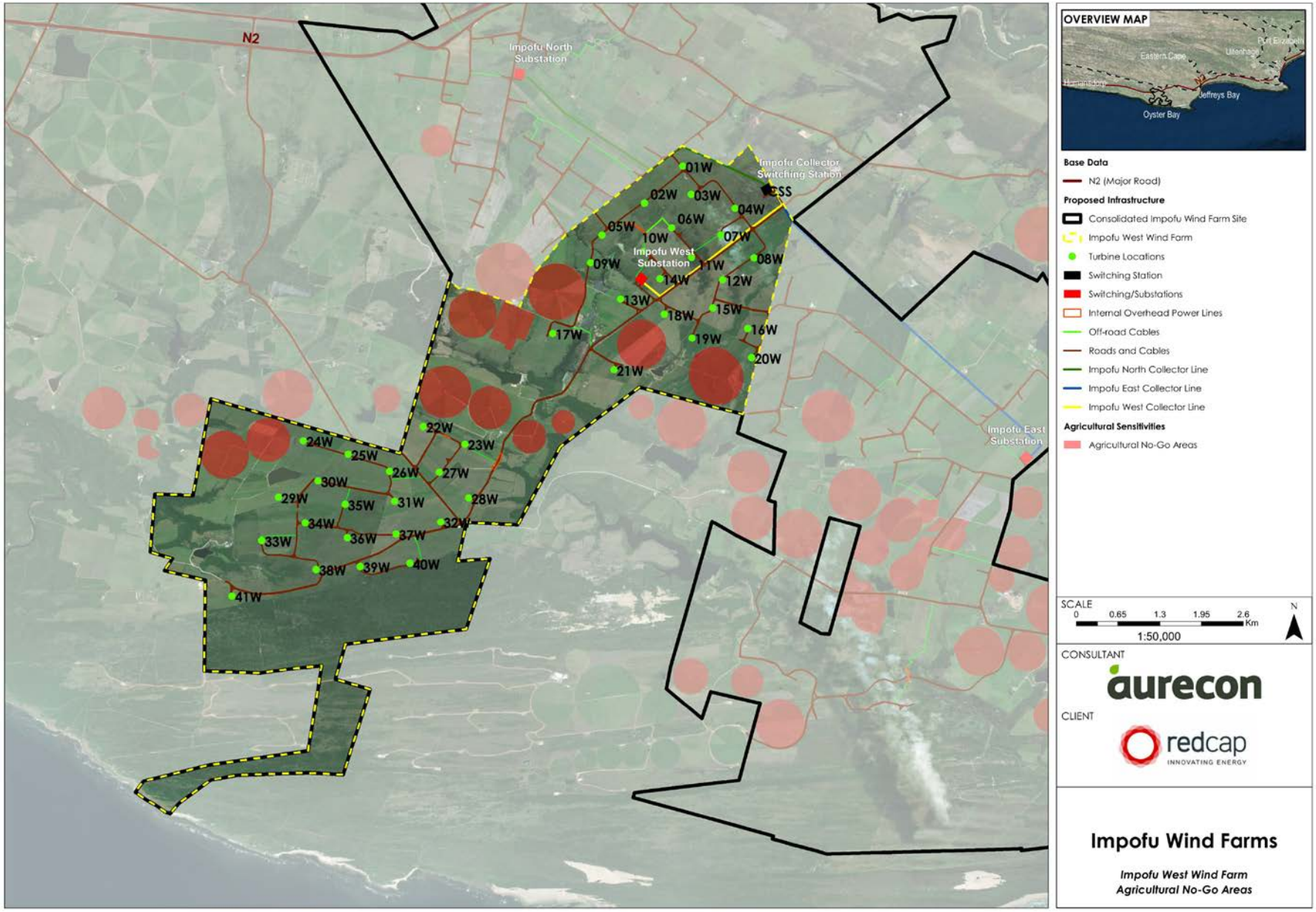

Figure 7.21: Proposed layout of the Impofu West Wind Farm and Agricultural No-Go areas

7.7.3 Potential impacts

The agricultural assessment by Lanz (2018) was informed by a case study, currently being undertaken by the Lanz, that is measuring the impact that three operational wind farms in the vicinity of the proposed development have had to date on agricultural resources, as well as the agricultural production of the impacted farms. The anticipated agricultural impacts discussed below have been informed by the preliminary results of this case study.

The agricultural impacts that could potentially result from the proposed construction, operation and decommissioning of the proposed Impofu West Wind Farm were specifically in relation to the loss of agricultural land use.

The primary impact of the proposed development will result in the loss of agricultural productive land, or potentially productive land that will be occupied by all the wind farm infrastructure and will become unavailable for agricultural use. The proposed construction footprint means that there will be a loss of arable land. The impact of loss of agricultural land is of **minor negative** significance, and will remain **minor negative** if the following mitigation measures are applied:

- Ensuring that during the design phase the total footprint has minimal impact on agriculturally productive land (already implemented by the current layout).
- Obtain input from the affected landowners/farmers on how to best minimise the impact on agricultural land (already implemented by the current layout).

Other potential issues and impacts identified by Lanz (2018) that are associated with agriculture on site during the construction, operational and decommissioning phase for the proposed project include the following:

- **Discontinuation of farming activities:** The associated impacts of the wind farm on the farmers, such as noise, traffic, labour influxes and associated safety and security concerns, wind farm derived income and other lifestyle impacts could influence them to discontinue farming, leading to a drop in agricultural production. Based on the evidence from the agricultural case study (on-going), the risk of this impact having a significant effect on agricultural production is insignificant. No mitigation measures exist to reduce such impacts and the significance remains **negligible negative.**
- **Interference with farming operations**: Wind farm activity and infrastructure, both during construction and operation, may disturb or interfere with farming practices, and thereby decrease productive efficiency on the farm and hence lead to decreased levels of agricultural production. The results of the case study (on-going) show that the farmers have experienced a nuisance factor during the wind farm construction phase, but almost none in the operational phase, and no impact on production during either phase. The impact is of **negligible negative** significance and can be mitigated to remain **negligible negative** by ensuring that the total footprint has minimal impacts on farming operations (already implemented by current layout) and to install cattle grids where necessary.
- **Degradation of natural agricultural resource base**: Wind farm construction and operation may negatively impact on the natural agricultural resource base by way of soil erosion, topsoil loss, drainage disturbance and water availability. The impact is of **negligible negative** significance and can be mitigated by applying systems of stormwater run-off control, facilitating the revegetation of denuded areas, and stripping, stockpiling and re-spreading topsoil at the disturbed areas.
- **Damage to natural agricultural resource base**: There is potential for depletion of potential agricultural water resources due to wind farm construction activities. Wind farm water use may deplete water resources that could have been used for agricultural production. The impact is of **negligible negative** significance and no mitigation is required.
- **Increased financial security for farmers**: Income earned by the farmers from the turbines on their land may benefit farming operations and increase investment into agricultural infrastructure, and thereby improve agricultural production levels. Based on the case study (on-going) there has been an upward trend in agricultural production which strongly suggests that this is a significant, positive impact

on agriculture. Therefore, the impact is considered to be of **moderate positive** significance and no mitigation is required.

- **Improvements to shared infrastructure**: Investments by the wind farm into improving and maintaining shared infrastructure, such as public district and minor roads, as well as road and stormwater infrastructure on farms, may benefit farming operations, and thereby agricultural production. The impact is of **minor positive** significance and can be enhanced by using input from the farmers into the design phase which will increase the usefulness of turbine access roads for their farming operations.
- I**mproved farm security**: The presence of wind farm personnel, including security personnel in the area, could provide improved farm security. The impact is of **minor positive** significance and no mitigation is required.

7.7.4 No-Go alternative

The No-Go alternative anticipates changes to the agricultural environment that would occur in the absence of the proposed development. In this scenario, the land is likely to remain at its current agricultural productivity. Therefore, the anticipated impact of the No-Go scenario on the environment from an agricultural perspective is neutral.

7.7.5 Conclusion and recommendations

The focus of the agricultural preliminary study was to determine to what extent the proposed Impofu West Wind Farm will compromise or enhance the current and future agricultural production of the study area. Based on the agricultural study and the investigated soils, the construction, operation and decommissioning of the proposed Impofu West Wind Farm and associated infrastructure is likely to result in a variety of direct and indirect impacts associated largely with the disturbance and loss of agricultural land. Most of the negative agricultural impacts are primarily influenced by the permanent footprint of disturbance caused by the wind farm infrastructure.

The proposed development is on land zoned and used for agriculture. Based on the in-progress agricultural case study which is to be concluded during the EIA phase, although the proposed development overlaps on cultivated farmland that supports intensive and productive dairy farming, the development is nevertheless highly unlikely to cause a reduction in agricultural production. A very small amount of production land will be lost, but the consequence of the lost land for agricultural production is negligible. It is likely that the positive impacts of the development will outweigh the negative impacts and that the development will therefore benefit farming and agricultural production.

The primary negative impact is therefore the loss of agriculturally zoned land. However, the areas to be impacted by the development are limited to only a small proportion of the total surface area of the site. In mitigating the negative impacts, the wind farm footprint has entirely avoided No-Go areas, identified at the Screening and Iterative Design Phase, and the layout design has had extensive input by the farmers, aimed at minimising the loss of productive land and of disturbance to their farming operations. Based on the agricultural case study (on-going), the Impofu West Wind Farm is likely to have a continued positive impact on the agriculture of the area, rather than threatening agriculture.

7.8 Socio-economic

The information included in this section is drawn from the Socio-economic Specialist Report attached as Appendix C6, undertaken by Mr Thomas Parsons from Urban-Econ Development Economists (Urban-Econ Development Economists, 2018).

7.8.1 Baseline description

The Impofu West Wind Farm site falls within the Kouga Local Municipality and the Sarah Baartman District Municipality. Land use is dominated by farming activities, mainly commercial dairy with cultivated dry-land and irrigated pastures. Currently, four operational wind farms are located in close proximity to the site, namely: Kouga Wind Farm, Gibson Bay Wind Farm, Tsitsikamma Community Wind Farm and Jeffreys Bay Wind Farm.

7.8.1.1 Population, income and employment profile

The following section provides an overview of the population, income and employment profile of the Kouga Local Municipality and is summarised in Table 7.6.

The Sarah Baartman District Municipality's total population was estimated at 444,735 individuals in 2016 (Stats SA, 2016), of which the Kouga Local Municipality accounts for 21.4% (95,270). The population growth within the Sarah Baartman District Municipality and Kouga Local Municipality was 0.9% between 2011 and 2016.

The average monthly income of households is relatively high at R10,598 for the Kouga Local Municipality and R8,889 for the Sarah Baartman District Municipality. Despite the relatively high household income for the Kouga Local Municipality, 15.3% of households do not have any income, resulting in a poverty headcount[8] that was recorded as 1.2% higher than the district average (4.5%), but lower than the provincial average (12.7%).

Table 7.6: Population, income and employment profile for the Sarah Baartman District Municipality and Kouga Local Municipality, 2016 (Urban-Econ Development Economists, 2018)

Indicator	Sarah Baartman District Municipality	Kouga Local Municipality
Population		
Population	444,735	95,270
Number of Households	122,911	28,173
Population density (km^2)	7.6	35.7
Average household size	3.6	3.4
Population growth rate (2011-2016)	0.4%	0.9%
Income		
Average monthly household income (2011, 2016 prices)	R 8,889	R10,598
Employment		
Labour force participation rate	63.0%	69.9%
Employed	150,081	37,998
Unemployed	35,157	6,045
Unemployment rate (% of labour force)	19.0%	13.7%

The employment profile for the Kouga Local Municipality indicates that only 13.7% of the total labour force is unemployed (consisting of scholars/students, pensioners and those who could not find work). This is notably lower than that of the Sarah Baartman District Municipality which has an unemployment rate of 19%[9].

According to the socio-economic study, these figures suggest that the Kouga Local Municipality is most likely experiencing an inward migration due to the availability of actual and perceived employment opportunities.

7.8.1.2 Economic profile

The Kouga Local Municipality contributed approximately 27.1% of the district municipality's Gross Domestic Product (GDP) in 2016 of which the largest contributors were finance and business services (26.4%), trade (21.3%), general government (16.6%) and manufacturing (11.2%). The agricultural sector contributes only a small proportion of GDP, but is considered an important employer, employing 8,422 or 22.1% of the working age population. The tourism industry within the Municipality is well established and characterised by a range of eco-tourism and adventure activities.

Even though the GDP contributions are considered relatively small, the Kouga Local Municipality is performing strongly in terms of its economic input due to its size and economic diversity. The Compounded Annual Growth

[8] Stats SA utilised the South African Multidimensional Poverty Index (SAMPI) to measure the extent of poverty in the country. The SAMPI is an index that is constructed using eleven indicators across four dimensions, namely: health, education, living standards and economic activity. Poverty headcount figures were then determined based on the proportion of households that are considered to be "multidimensional poor" in terms of the index (Urban-Econ Development Economists, 2018).
[9] Labour force participation rate: 63%

Rate for the municipality was 2% over the past five years, indicating a faster growth rate than district (1.7%) and provincial economies (1.3%).

The transport, storage and communication sector has been growing by 3.2% over the last five years, making it the best performing sector. Other fast-growing sectors are general government (2.6%), manufacturing (2.3%) and finance and business services (2.3%). However, the mining and quarry sector's contribution to the GDP has been declining by 0.1% year-on-year between 2011 and 2016. In addition, the primary sector's contribution to the municipality's economy has declined from 5.8% to 5.3% over the same time period.

The agricultural sector has experienced an increase in both GDP and employment between 2011 and 2016 (see Table 7.7). During this period, over 2,000 jobs were created in the agricultural sector, making it the largest employment creator (at 6.9%) in the municipality.

Agricultural activities are labour intensive, so a small decline in the size of the sector would generally lead to more job losses than what would occur in a capital-intensive sector (e.g. manufacturing). For this reason, the agricultural sector is generally prioritised in development strategies.

Table 7.7: Employment profile of the Sarah Baartman District Municipality and Kouga Local Municipality according to the different economic sectors, 2011-2016 (Urban-Econ Development Economists, 2018)

Sector	Share of total employment				Absolute change 2011-2016
	Sarah Baartman District Municipality		Kouga Local Municipality		
	2011	2016	2011	2016	
Primary sectors	20.4%	23.5%	19.3%	22.2%	2.9%
Agriculture and hunting	20.4%	23.5%	19.3%	22.2%	2.9%
Mining and quarrying	0.0%	0.0%	0.0%	0.0%	0.0%
Secondary sectors	14.4%	14.2%	16.1%	15.3%	-0.8%
Manufacturing	6.5%	5.8%	5.9%	5.1%	-0.8%
Electricity, gas and water	0.3%	0.3%	0.3%	0.3%	0.0%
Construction	7.7%	8.1%	10.0%	9.9%	-0.1%
Tertiary sectors	65.1%	62.3%	64.6%	62.5%	-2.0%
Trade	24.5%	23.1%	27.1%	25.9%	-1.2%
Transport and communication	3.5%	3.6%	2.8%	2.9%	0.0%
Finance and business services	8.7%	8.3%	9.4%	8.8%	-0.7%
General government	12.5%	11.1%	10.3%	9.9%	-0.4%
Community services	16.0%	16.2%	14.9%	15.1%	0.2%
Total employment	**125,532**	**150,081**	**31,286**	**37,998**	**6,712**

7.8.2 Site sensitivity

Socio-economic sensitivities relate to the land uses that have economic value and also nearby sensitive receptors. The proposed project would be located on farms with intensive, high production agricultural land, except in one instance. The sensitive receptors associated with the project are the farming enterprises within the project site boundary.

Although no major tourism attractions are located on the site, the study area is in close proximity to several important tourism attractions, namely: 1) the resort town of Oyster Bay; 2) Baviaanskloof Wilderness Area; 3) Tsitsikamma National Park; and 4) Huisklip Nature Reserve (2 km from the wind farm site).

It is important to note that the socio-economic consultant has had limited interaction with the local communities and other affected parties within the study area. The estimated number of people that will be directly affected by the proposed project will be assessed in detail during the EIA Phase.

7.8.3 Potential impacts

It is expected that the national and local economy would be temporarily stimulated through construction related spending and additional spending by small, medium, micro enterprises (SMMEs) involved in the construction of the wind farm which would in turn result in an increase of national, provincial and local GDP. This impact is considered **moderate positive** with and without mitigation**.** Other potential impacts (with and without mitigation) to the national and local economy include:

- The impact of a sustainable increase in national and local government revenue through higher property taxes and wage payment and is of **moderate positive** significance.
- The temporary increase in government revenue through higher personal income tax, VAT, companies tax, etc. during the construction phase and is of **minor positive** significance.
- Sustainable increase in production and GDP through ongoing operational spending (i.e. maintenance) by the wind farm and is expected to be of **moderate positive** significance.

The following mitigation measures are proposed:

- Increasing local procurement practices and promoting the employment of people from local communities, as far as feasible.
- Procurement of construction materials, goods and products from local suppliers where feasible.
- Making use of local companies and suppliers, particularly SMME's and Broad-Based Black Economic Empowerment (BBBEE) compliant enterprises, where feasible.

During the construction phase, a number of direct (constructing of the wind farm) and indirect (created by SMMEs) temporary employment opportunities will be created nationally and locally. This impact is considered **moderate positive** with and without mitigation. Some of these employment opportunities would extend into the operational phase (e.g. provision of security, staff transport and maintenance activities either by the wind farm operator or through local SMMEs) and would have a **moderate positive** impact with and without mitigation. The following mitigation measures are proposed:

- Identification of potential skills that could be sourced in the area.
- Recruiting of local labour as far as feasible.
- Making use of local construction companies and suppliers, particularly SMME's and BBBEE compliant enterprises, where feasible.

Skills development programmes undertaken by contractors would contribute to skills development in the national and local economy. This impact is considered **minor positive** without mitigation and can be increased to **moderate positive** by implementing mitigation measures. Permanently employed workers would also have the opportunity to improve and develop during the operational phase and is of **moderate positive** significance with and without mitigation. The following mitigation measures are proposed:

- Facilitating knowledge and skills transfer between foreign technical experts and South African professionals during the pre-construction and construction phases.
- Establishing vocational training programmes and/or bursary schemes and/or apprenticeship programmes for the local labour force to promote the development of skills required by the wind farm and thus provide for the opportunity for these people to be employed at other similar facilities.

It is anticipated that increased visual and noise disturbances during the construction phase would change the area's sense of place and is considered **minor negative** with and without mitigation. During the operational phase, this impact is expected to be of **negligible negative** with and without mitigation. The following mitigation measures are proposed:

- Implementing mitigation measures proposed by the visual and noise specialists.
- Preventing disturbances to natural areas outside the development footprint required for the wind farm.
- Implementing traffic control and management measures.
- Managing maintenance hours over weekends and outside business hours during the week.

The impact of changes in the visual environment on the local tourism industry and agriculture sector during the construction phase is considered **negligible negative** with and without mitigation. During the operational phase, this impact is expected to be of **minor negative** significance without mitigation and **negligible negative** with mitigation. The following mitigation measures are proposed:

- Implementation of mitigation measures proposed by the visual and noise specialists.
- Implementing traffic control and management measures.
- Implementation of effective dust pollution mitigation measures.
- Managing construction hours over weekends and outside business hours during the week.

The potential decline in the number of tourists visiting local tourism sites is likely to reduce the revenue of these businesses. This could have a **minor negative** impact on the livelihood of households that are directly or indirectly dependent on the tourism and game industry in the visually affected area. The significance of this impact can however be reduced to **negligible negative** with mitigation.

The proposed wind farm could also have a positive impact (with and without mitigation) on households by:

- Providing higher construction workers salaries and wages (**minor positive** significance).
- Improving the standard of living of households of permanent employees of the wind farm during the operational phase, and/or SMMEs for example, who derive economic benefit by providing services to the wind farm (**minor positive** significance).
- Providing farmers (with wind turbines on their property) with an additional income source that offers them an opportunity to further invest and develop their farms. Such additional investment could motivate farmers to employ additional workers and/or increase their salary/wage bill. These increases would in turn, improve the livelihoods of farm workers and farmers (**moderate positive** significance).

The following mitigation measures are proposed:

- Implementing mitigation measures proposed by the visual specialist.
- Investigating options to provide job opportunities to retrenched employees of nearby tourism facilities or assisting them through the enterprise development programme and/or social development funding allocations prescribed by government.
- Investigating potential partnerships with tourism establishments to support affected families and ensure that the aid given to them is retained.
- Recruiting of local labour as far as feasible.
- Making use of local construction companies and suppliers, particularly SMME's and BBBEE compliant enterprises, where feasible.

The increased movement of heavy equipment on site and use of local social facilities (e.g. clinics) by construction workers, is expected to have a **minor negative** impact on economic and social infrastructure but can be reduced to **negligible negative** with mitigation. The influx of people could also result in a temporary increase in social conflicts (e.g. crime, litter, etc.) which would of **minor negative** significance. This impact can however be managed and reduced to **negligible negative** by implementing certain mitigation measures. The following mitigation measures are proposed:

- Implementing traffic control and management measures.
- Engaging with relevant local authorities (and provincial if necessary) regarding the development of the wind farm and their ability to meet the additional demands on social and basic services created by the influx of workers.
- Assisting local municipalities to ensure that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations.
- Implementing a recruitment strategy.
- Developing transportation services between the construction site and area of residence.
- Developing a conflict/complaints management and resolution plan.

Potential local economic and social development benefits derived through the establishment of a community trust for community upliftment projects are of **moderate positive** significance with and without mitigation. In addition, the following mitigation measure is proposed:

- Enterprise Development and Socio-economic Development initiatives outlined in the REI4P bid must be effectively implemented.

The potential impact on actual and perceived property and land values within the immediately affected area could be of **minor negative** significance without mitigation. This can be mitigated to **negligible negative** by implementing the following measures:

- Implementing mitigation measures proposed by the visual specialist.

It is anticipated that the increase of energy supply during the operational phase would benefit both residents and business owners in that the reliability of the current supply would improve due to a strengthened local grid. This impact is of **moderate positive** significance.

7.8.4 No-Go alternative

The No-Go alternative implies that the socio-economic profile of the Kouga Local Municipality would remain unchanged. For this reason, the anticipated impact is rated as neutral. However, should the Impofu West Wind Farm not be developed, the potential job opportunities, and associated improvement in livelihoods, that could be created are forgone, as well as improvements in national energy supply.

7.8.5 Conclusion and recommendations

The preliminary assessment of potential impacts suggests that from a socio-economic perspective, the proposed Impofu West Wind Farm is acceptable and would have a predominately positive impact on the socio-economic environments of the Kouga Local Municipality.

Further detailed assessments of the potential impacts during the EIA Phase will be undertaken and would include interviews with I&APs (i.e. effected and adjacent landowners; municipal LED officers; local tourism organisation representatives etc.). These interviews would form the basis of a more detailed assessment (including an economic impact assessment of project costs) that would assist with accurately validating and quantifying the preliminary information discussed in this section.

7.9 Palaeontology

The information included in this section is drawn from the Palaeontological Specialist Report attached as Appendix C7, undertaken by Dr. John Almond from Natura Viva (Almond, 2018).

7.9.1 Baseline description

Palaeontological resources include fossilised materials such as buried fossils and rock units. Since some potential palaeontological material is buried, it is often only found during the construction phase of a project.

According to Almond (2018), the project falls within the southern coastal platform in the Kouga region near Oyster Bay, Eastern Cape, overlapping with the south-eastern end of the Kareedouwberge range of the Cape Fold Belt. The area is characterised by Ordovician to Early Devonian sediments of the Table Mountain Group and Bokkeveld Group, refer to Table 7.8 and Figure 7.22. These marine to continental Palaeozoic bedrocks are assigned to the Peninsula, Cederberg, Goudini, Skurweberg, Baviaanskloof and Gydo Formations of the Cape Supergroup. The site is located on a coastal platform with a gently-sloping topography. The environmental features of the site points to a dynamic landscape of river and stream banks, erosion gullies, borrow pits and quarries, road and railway cuttings and farm dams.

In terms of palaeontology, most of the pertinent rock units are only sparsely fossiliferous to unfossiliferous. These rock units are normally widely dispersed. Scientifically important fossil assemblages have been recorded from the Cederberg and Baviaanskloof Formations of the Table Mountain Group as well as the Gydo Formation

at the base of the Bokkeveld Group in the broader Cape region. High levels of tectonic deformation as well as chemical weathering have compromised the palaeontological features within the study area. All of the sedimentary formations represented within the study area contain fossils or traces of fossils. A site inspection revealed low palaeontological sensitivity within the site. The most important fossil groups recorded within the site are fossils in the Table Mountain Group, fossils in the Bokkeveld Group and fossils in the Algoa Group.

A range of shallow marine to nearshore fluvial and estuarine trace fossils have been recognised to occur in the Peninsula Formation, and identified mainly from the Western Cape outcrop area. The palaeontologist identified marine trace fossils in the uppermost Peninsula Formation in an existing quarry near Rosenhof farmstead in the Impofu West Wind Farm site. No additional body or trace fossils were observed within the Table Mountain Group rocks within the Impofu Wind Farms study area. Apart from low exposure levels, this can be attributed to high levels of bedrock weathering underlying the coastal platform.

The palaeontological investigation recorded shelly marine invertebrates and traces (burrows etc), together with rare fish remains, primitive vascular plants (probably mis-assigned to this stratigraphic unit), trace fossils (burrows, borings etc) and microfossils as the most important fossil groups from the lower Bokkeveld Group. The mudrock dominated lower Bokkeveld Group sediment within the study area is poorly exposed, and where visible (i.e. in road cuttings) are deeply weathered and cut. Based on the palaeontological study the potential of significant Bokkeveld fossil material being maintained under these conditions is very low.

The sparsely distributed palaeontological record of the Algoa Group consists mainly of fragmentary marine shells, foraminifera and a small range of terrestrial snails. Dense arrays of calcretised rhizoliths (root casts) commonly occur in these and contemporary Plio-Pleistocene aeolianites along the southern and southwestern coast. Based on the palaeontological investigation, a few, highly-weathered examples of possible subterranean termite nests were recorded within ferruginous colluvial gravels overlying weathered Peninsula Formation bedrocks. These fossil traces are not regarded as high conservation significance.

Table 7.8: Main geological units in the study area

Group	Formation
Table Mountain Group (Ordovician to Early Devonian)	Peninsula Formation (Op, middle blue) Cedarberg Formation (Oc, grey) Goudini Formation (Og, grey-green) Skurweberg Formation (Ss, pale blue) Baviaanskloof Formation (S-Db, dark blue)
Bokkeveld Group (Early Devonian)	Gydo Formation (Dg, v. pale blue)
Algoa Group (Late Caenozoic, Pliocene / Quaternary to Recent)	Nanaga Formation (T-Qn, orange-brown) – N.B. outcrop area is underestimated on map; unmapped relict patches of this formation are present within the present study area.

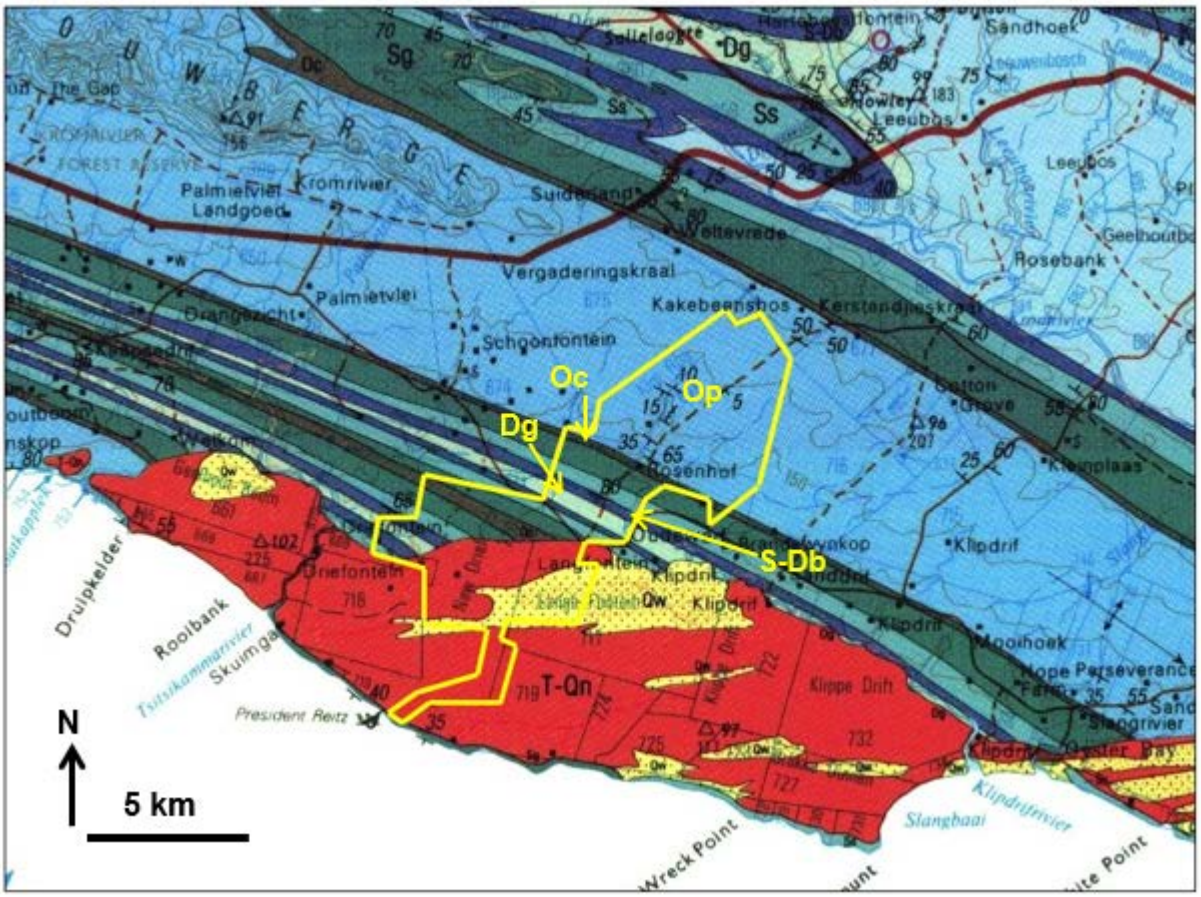

Figure 7.22: Extract from 1: 250,000 geology sheet 3324 Port Elizabeth (Council for Geoscience, Pretoria). The main geological units represented within the study area are listed in Table 7.8

7.9.2 Site sensitivity

Palaeontological sensitivity is directly related to the capability to preserve palaeontological heritage resources. The relevant palaeontological study indicates that the palaeontological sensitivity of the Humansdorp region is generally low as far as the bedrocks are concerned, especially because of the high levels of chemical weathering and tectonic deformation observed within the area. Two quarry sites of geoheritage / palaeontological interest were identified by the palaeontologist near the Rosenhof farmstead (within the Impofu West site boundary). However, the two quarry sites will not be directly impacted by the proposed wind farm development. The sites show traces of equivocal fossils which are not regarded as of high conservation significance and will not be impacted by the development footprint. Apart from the trace fossil site in one of these existing quarries, near Rosenhof farmstead, no significant fossil sites were recorded during the field survey of the Impofu West Wind Farm project area and the overall palaeontological sensitivity of the area is rated as low.

7.9.3 Potential impacts

The predicted palaeontological impacts that could potentially result from the proposed construction of the proposed Impofu West Wind Farm and associated infrastructure were specifically in relation to disturbance and damage of fossil heritage. The anticipated palaeontological impacts are likely to occur during the construction phase of the proposed development, as some potential fossil heritage material is buried. The placement of turbines and associated infrastructure could result in the loss of fossil heritage. During construction disturbance, damage and destruction of fossils preserved at the surface or below ground is likely to occur as a consequence of clearance, earthworks and excavations for construction activities which include wind turbine foundations, underground cabling and access roads. The predicted impact is of **negligible negative** significance and can

be mitigated by the recording and sampling of significant fossils by a professional palaeontologist and safeguarding and reporting any potential fossil finds to the ECPHRA.

7.9.4 No-Go alternative

The No-Go alternative anticipates changes to the paleontological environment that would occur in the absence of the proposed development. In this scenario, natural weathering processes and erosion will continue to steadily destroy fossils preserved near or at the ground surface, but at the same time new fossils will be continually exposed. Therefore, the anticipated impact of the No-Go scenario on the environment from a paleontological perspective is neutral.

7.9.5 Conclusion and recommendations

The focus of the palaeontological investigation was to determine, assess or predict the diversity, density and distribution of fossils within and beneath the study area, as well as their heritage or scientific interest. The potential impacts during the construction phase, with mitigation, are considered of a negligible negative significance on the palaeontology on site, as well as, on the regional context. The study has found that there are no significant palaeontological resources present on site, and the overall palaeontological sensitivity of the area is rated as low.

The primary negative impact involves the disturbance, damage or destruction of fossil material within the development footprint during the construction phase. Due to the absence of well preserved, unique and significant fossil resources on site, the predicted impact on fossil heritage is of negligible negative significance. Pending the potential discovery of significant new fossil remains (e.g. vertebrate bones and teeth, horn cores, shells, trace fossils, plant compressions) during the construction phase of the Impofu West Wind Farm development, no further specialist palaeontological studies or mitigation are recommended for this project in the EIA and construction phases.

7.10 Archaeology

The information included in this section is drawn from the Phase 1a Archaeological Impact Assessment (AIA) Report attached as Appendix C8 compiled by Dr Peter Nilssen (Nilssen, 2018). The proposed development triggers Section 38 of the National Heritage Resources Act (25 of 1999; NHRA) and the AIA will ensure compliance with the heritage legislation. The cultural landscape is also considered in the AIA.

7.10.1 Baseline description

Based on previous studies undertaken in the surrounding environment, it is known that the area contains heritage resources including a variety of historic period structures, associated cultural materials, graves and grave yards. Heritage resources of the prehistoric period, particularly in the areas further than 5 km inland from the present-day shoreline, are most commonly represented by Early Stone Age (ESA) and Middle Stone Age (MSA) stone artefacts in open contexts. Nilssen (2018) consulted various heritage studies (refer to Attachment D8 for the complete list of references) conducted for various projects in the broader area. One important one is a comprehensive desktop study undertaken by Binneman and Reichert (2017) that summarised the relevant findings from the heritage studies for all the renewable projects and other infrastructure projects in the area. In their report, Binneman and Reichert (2017) reported the following regarding the Impofu West site:

> *"The desktop study identified only a few locations (all north of the southern boundary of the WEF) where Early and Middle Stone Age stone tools were observed. These stone tools were found randomly scattered without any recognised distribution patterns. They were in secondary context and not associated with any other archaeological materials, and therefore are of low cultural significance. Most of the area is also already disturbed by farming activities. Based on our experiences and knowledge gained from other investigations in the immediate area and the wider surrounding region, it would appear that the area in general is of low cultural sensitivity and it is unlikely that any in situ archaeological remains will be exposed during the development.*

There are, however, areas of concern with regard to the southern area of the proposed footprint ... These areas fall roughly within, what we would call the 'sensitive coastal archaeological zone', and needs to be carefully managed to limit the impact on archaeological resources and the cultural landscape. Ideally, we would like to recommend that no development takes place in these areas. There are small 'undisturbed' dune areas covered by coastal fynbos vegetation to the west of Oyster Bay and preferably these areas must be avoided as there is a high possibility that in situ archaeological sites/materials will be damaged/destroyed (See Figure 5 and KMZ file). These areas were also assessed as part of a Heritage Impact Assessment for one of the alternatives for the Gibson Bay grid connection. The heritage specialist did not favour the construction of the grid connection in the undisturbed areas and recommended another alternative (Nielsen 2014). We therefore recommend that the development within the footprint be limited to previously disturbed areas, providing that all activities are closely monitored at all times and that specialist recommendations must be followed regarding any heritage finds.

A further concern is the far south-western corner of the proposed WEF which borders on the Tsitsikamma River and adjacent Geelhoutboom dune area. The world renowned Klasies River Caves are some 5 km to the west. We regard the Geelhoutboom dune system as part of the western extension of the cultural landscape which stretches from the Klasies River in the west to the Krom River in the east. The Geelhoutboom archaeological landscape has been described by Prof. H.J. Deacon as of spectacular proportions and the largest artefact scatter observed along the southern Cape coast. There is a red no go zone of almost one kilometre along the Tsitsikamma River and it is recommended that no turbines are place within this zone to keep the visual impact on this part of the cultural landscape as low as possible" (Binneman and Reichert 2017, pages 17 and 18)".

The current development proposal has proactively excluded two large areas of potentially developable land from the wind farm project as well as the one kilometre long stretch immediately east of the Tsitsikamma River as described above in the excerpt. Refer to Figure 5.2 to Figure 5.5 which illustrate these No-Go areas.

7.10.1.1 Pre-colonial / Stone Age period

Several heritage related studies have been conducted along the nearby coastline and has shown the greater area to be rich in archaeological resources of Early, Middle and Later Stone Age (LSA) origin. ESA materials typically include Acheulian hand axes, cleavers and chopping tools that date from between approximately 1.5 million and 250,000 years ago and is the earliest evidence of human ancestors occupying this area. A large scatter comprising thousands of ESA and MSA stone artefacts was identified in previously ploughed and disturbed sediments to the north of the Impofu Wind Farms site, but this ESA site will not be affected by the proposed Impofu Wind Farms development. Below is an example of *in situ* ESA artefacts in ancient aeolian deposits found at a quarry located within the proposed Impofu West site (IW7). The stone artefacts are bedded in Plio-Pleistocene aged Nanaga aeolianites (from about 5 million to 12 000 years old) that were exposed as a result of recent quarrying activities (Almond 2017) (Figure 7.23). This quarry is avoided in the latest Impofu West Wind Farm development design, and therefore these heritage resources are no longer threatened and are preserved.

Figure 7.23: Encircled in white are in situ stone artefacts bedded in ferricretised aeolian sands; the photo on the right is a typical crude bifacial early stone age hand axe in quartzite

Artefacts from the MSA (in this area 250 to 30 thousand years ago) are characterised by flake and blade industries and carries evidence for core preparation on prepared or faceted striking platforms of points, flakes and blades (Figure 7.24). The Klasies River Cave Complex is located approximately 8 km west of the Impofu Wind Farms boundary and contains evidence of human occupation for the last 120,000 years (refer to Klasies River on Figure 7.25). Another significant MSA site in the greater area also shown on Figure 7.25 is the Brandewynkop dunes. The Klasies River Cave Complex and Brandewynkop will likely not be impacted by the proposed Impofu West Wind Farm as they are not included in the greater wind farm footprint.

Figure 7.24: Example of flaked quartzite (left) and stone age flake (right) at the Impofu West site

Substantial technological improvements over the MSA era characterise the LSA in this area. This includes amongst others wide spread occurrence of rock art, decorative objects, human burials with grave goods including painted stones, expanded stone tool kit, bone tools, ostrich shell containers etc. Many of the LSA sites in the area are shell middens, and although these usually occur within a few hundred metres of the shoreline, they are also found up to 5 km inland.

A number of LSA sites occurring in the dune systems along the 5 km strip and their contents have been identified and described for the greater area. No significant LSA sites have, however, been recorded by previous studies in the immediate vicinity of the present study area.

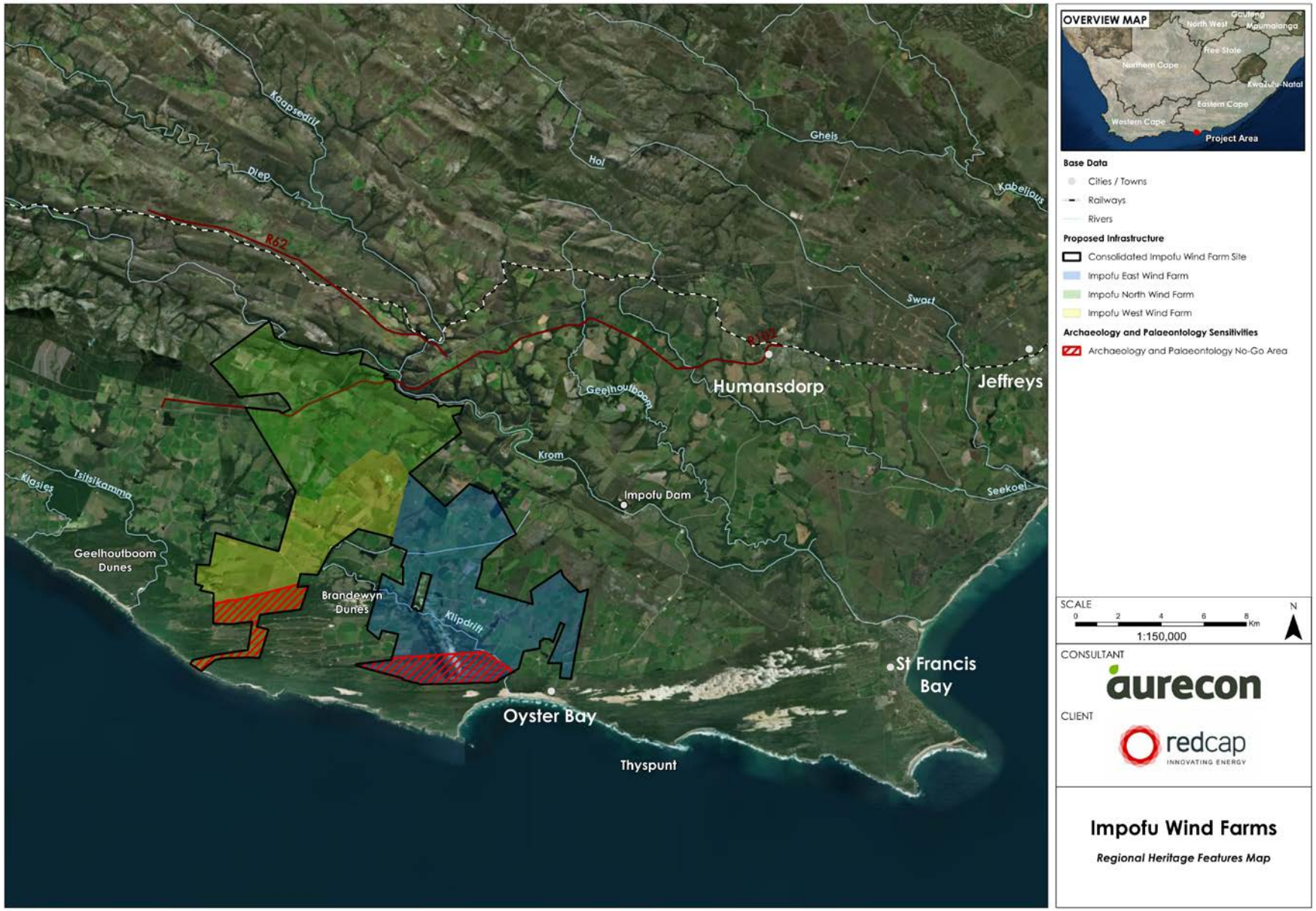

Figure 7.25: Regional heritage features

7.10.1.2 Pastoralist / herder period

Approximately 1,800 years ago KhoiKhoi peoples settled in the area and brought with them a significant shift in the socio-economic setting of the area. The most common archaeological traces of the pastoralist / herder lifestyle in the area include large stone features associated with cooking, shell middens with pottery only and shell middens with pottery and domesticated animals.

The KhoiKhoi were the first food producing peoples in South Africa who brought domestic stock, pottery / ceramic containers and bowls and associated cultural items into the region. A lifestyle still closely connected with nature would have allowed for likely easy and mutually beneficial relations between KhoiKhoi and hunter-gatherer (San) peoples. Descendants of these first farming peoples, and offspring from converging KhoiKhoi and San families, such as members of the Gamtkwa Khoisan Council, still live in the region today.

7.10.1.3 Colonial / historic period

The colonial period settlers are mostly of European origin and started settling in the area in the 1700's. With large scale cattle farming (mostly dairy) as well as clearing natural landscapes for pastures and croplands, these settlers have had the most dramatic effect on the environment.

Heritage resources of this period include dwellings and associated structures and material culture as well as cemeteries, marked and unmarked human burials older than 60 years or of historic significance.

7.10.1.4 Cultural landscape

The term 'cultural landscape' constitutes the imprinting of human behaviour on the environment, and the relationship between people and the landscape. Nomadic hunter-gatherers and to a lesser extent early pastoralist lifestyles of pre-historic inhabitants leaves little to no physical evidence of their presence in the landscape and has a negligible modifying effect on the landscape. This is in stark contrast to the impact that the past few hundreds of years of colonial agriculture has had on the landscape.

The value of cultural landscapes are mainly determined through professional interpretation (academic) and opinion, community and public values as well as environmental and heritage legislation. This cultural landscape is defined and informed through, amongst others, natural landscape features, palaeontology, archaeology / anthropology, oral histories and public memory. The cultural landscape of the greater study area comprises of three broad layers:

- 1st Layer: Most recent colonial settlement and development resulting in the most visually modifying effect on the landscape. Impacts / features related to this cultural layer includes: roads, single vehicle tracks, agricultural clearings for grazing and cultivation, variety of farming activities, variety of farmsteads, structures etc.
- 2nd Layer: Pastoralist or herder period dating to the last 2,000 years.
- 3rd Layer: The three stone age periods (described above) dating between a few hundred years ago to 1.5 million years ago.

Although the prehistoric cultural landscape is the least evident and often invisible, temporally, it makes up for the overwhelming bulk of human occupation of the region. It can thus be argued that the most significant cultural layer in this area involves the pre-colonial cultural landscape and its sense of place. The cultural landscape of the greater area comprises the 5 km wide strip along the coast from St. Francis Bay to Klasies River, refer to Figure 7.25. Thyspunt has also been recognised as a site of cultural significance and the SAHRA will not approve developments that have a negative impact on the Thyspunt area.

The most recent layer of the cultural landscape is made up of the existing Kouga, Gibson Bay, Tsitsikamma Community and Jeffery's Bay Wind Farms and associated power lines.

7.10.2 Site sensitivity

Parts of the southern portion of the Impofu West Wind Farm site is situated in the archaeologically sensitive coastal zone, also referred to as a pre-colonial cultural landscape. The previously undisturbed and

archaeologically sensitive area west of Brandewynkop and stretching down to the shoreline in the south was identified as a No-Go zone and has been excluded by the development footprint. In addition, the proposed development is more than 2.5 km from the Tsitsikamma River, and excludes the area immediately east of the Tsitsikamma River. The proactive exclusion of wind farm development activities from these areas has helped to reduce the impact on the pre-colonial cultural landscape. Most of the area covered by the proposed wind farm development is more than 5 km from the present day shoreline and thus lies inland of the archaeologically sensitive coastal zone and pre-colonial cultural landscape.

Archaeological site surveys were undertaken in September 2017 and between 28 March 2018 and 4 April 2018 by Nilssen (2018). Archaeological resources identified at the study area are shown on Figure 7.26. These archaeological resources include:

These archaeological resources include:

- Low density scatter of ESA origin, including a crude bifacial hand axe or core, a large piece of flaked quartzite, large flakes and a large hammer stone (IW1) – these artefacts are avoided by the current development footprint;
- Low density scatter of stone artefacts dominated by specimens of MSA age, including examples of flaking or quarrying of quartzite outcrops (IW2) - these artefacts are avoided by the current development footprint;
- Stone Age quarry site situated about 250 m north west of find IW2. This locality consists of quartzite outcrops with numerous flake scars indicative of Stone Age people extracting pieces of stone from the outcrop for the manufacture of stone tools – this site is avoided by the current development footprint;
- Historic period disused feeding / watering trough made of modern materials (IW4) – not conservation worthy and no mitigation is required;
- Stone Age quarrying / flaking of outcropping quartzite (IW5) – not impacted by the current design layout, but should be fenced as a precautionary measure during construction;
- Late Stone Age and Middle Stone Age stone artefacts in sand quarry (IW6)- no mitigation is required, but it is recommended that archaeological monitoring of the area to the south of the dashed white line shown in Figures 6 and 9 in Nilssen (2018) be undertaken during construction.
- *In situ* Middle Stone Age and Early Stone Age stone artefacts in the exposed geological profiles of a quarry (IW7) – avoided by current design layout, but it is recommended that archaeological monitoring of the surrounds within the dashed white ellipse shown in Figures 6 and 9 in Nilssen (2018) be undertaken during construction.

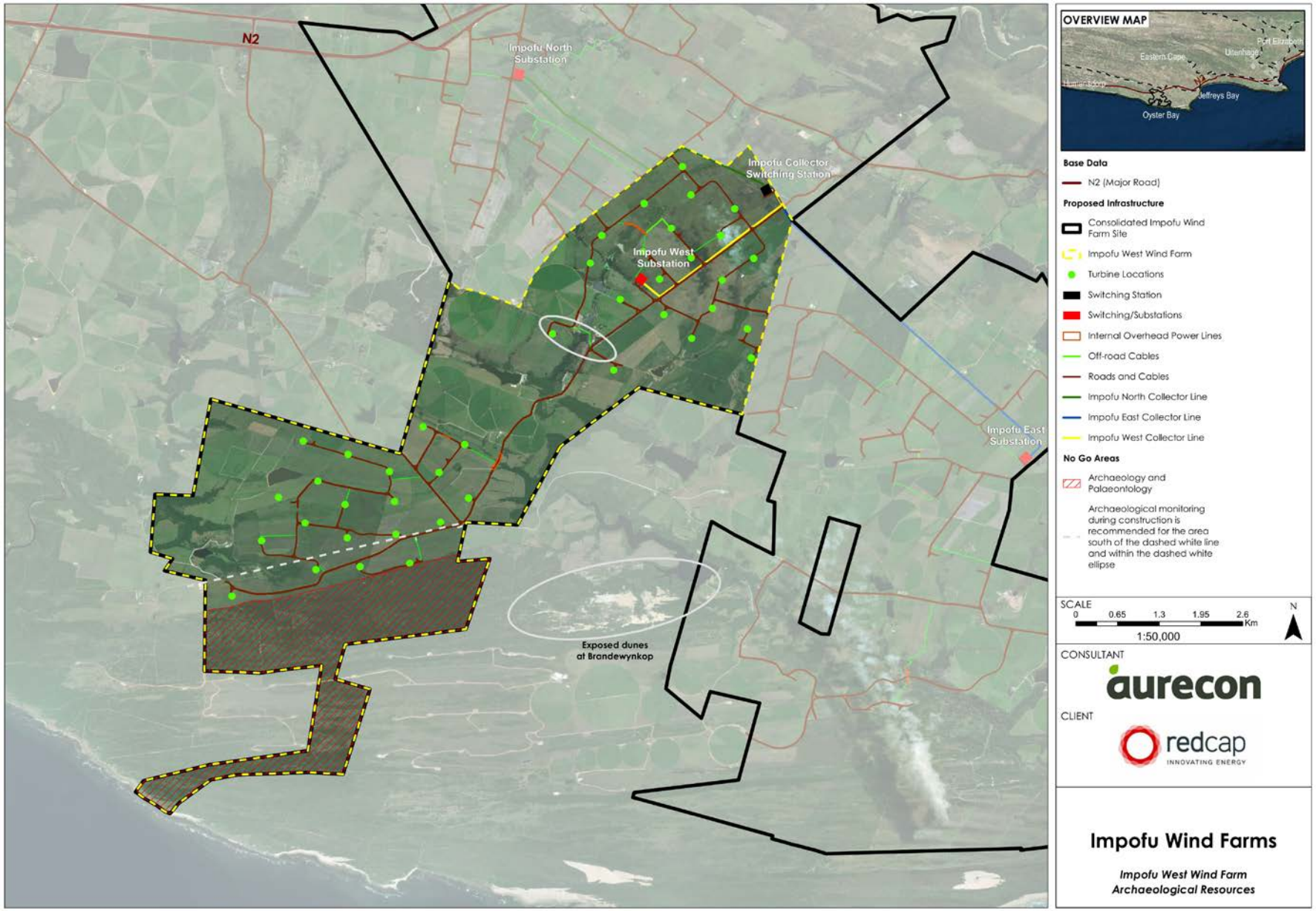

Figure 7.26: Archaeological resources on the Impofu West site

7.10.3 Potential impacts

ultimately the cultural landscape and the construction phase is therefore considered a potential risk to these resources. It is very likely that implementation of the proposed mitigation measures provided by Nilssen (2018) can greatly reduce the direct impact of the Impofu West Wind Farm. Commissioning of the AIA as part of the environmental process will also likely result in a positive impact in that the study has greatly improved the record and understanding of archaeological material in the area, and provided an opportunity to conserve them.

The only potential impacts resulting from the proposed development are the following – all other potentially sensitive heritage artefacts (listed in Section 7.10.1.2) have been avoided by the current layout design:

- Potential impact on the *in situ* Middle Stone Age and Early Stone Age stone artefacts at quarry IW7; and
- Potential impact on the pre-colonial cultural landscape along the 5 km coastal strip.

The stone age quarrying site comprises of a fairly small quartzite outcrop where numerous flake scars resulting from Stone Age quarrying of raw material for the manufacture of stone tools occur. The quarry is in close proximity to proposed construction works and the likely impacts can be reduced from **major negative** to **minor positive** with the following mitigation measure:

- It is recommended that the surrounding area of the Impofu West Wind Farm site within the dashed white ellipse shown in Figure 6 of the Phase 1a AIA (Nilssen, 2018) be monitored during construction. Archaeological monitoring should be supervised by a suitably qualified and accredited professional archaeologist during the construction phase of the development.

The 5 km wide coastal strip has been identified as a sensitive area in terms of archaeological resources and the greater pre-colonial cultural landscape. The undisturbed coastal dune portions of this area has been marked as a No-Go zone for the proposed wind farm development (refer to Figure 7.25) and will likely reduce the visual and physical impact of the wind farm on this area. The potential impact on the pre-colonial cultural landscape can be mitigated from **moderate negative** to **minor positive** with the following mitigation measure:

- It is recommended that archaeological monitoring be undertaken in the area south of the white dashed line as indicated Figure 6 of the Phase 1a AIA (Nilssen 2018). Archaeological monitoring should be supervised by a suitably qualified and accredited professional archaeologist during the construction phase of the development.

7.10.4 No-Go alternative

The No-Go alternative means that the proposed project will not be developed and the *status quo* will remain at the site. This will likely involve continued negative impacts of low or unknown significance on archaeological resources due to natural processes and agricultural activities. The overall impact of the proposed development is likely to be low, therefore if the existing impacts can be controlled as well as monitored, then there is no preference between developing and not developing the proposed Impofu West Wind Farm.

7.10.5 Conclusions and recommendations

The AIA for the proposed Impofu West Wind Farm was informed through a detailed desktop literature review and various site surveys by the archaeologist, as well as an iterative screening process to identify No-Go areas. The main conservation worthy archaeological sites that will be conserved at Impofu West Wind Farm site are: the exclusion of the archaeological sensitive area in the undisturbed dunes in the south shown as a No-Go zone; the avoidance of stone age quarry sites and associated low density artefact scatter; and the avoidance of *in situ* early stone age and middle stone age materials in the quarry (positive impact of preserving the resources at the quarry). The development proposal therefore has no fatal flaws from an archaeological perspective.

7.11 Noise and shadow flicker

The information included in this section is drawn from the Noise and Shadow Flicker Specialist Report attached as Appendix C9, undertaken by Ms. Lien van Breusegem of 3E Renewable Energy Services (3E, 2018).

7.11.1 Baseline description

Wind turbines are responsible for both aerodynamic and mechanical noise which can be emitted as self-noise (interaction of the turbulent boundary layer with the blade trailing edge), inflow turbulence (turbulence from the wind interacting with the blades), frequency noise (due to tailing edge thickness or unstable flow close to the surface of the blade) and noise from the rotor tips.

Shadow-flicker occurs when the rotation of wind turbine blades results in alternating periods of shadow and light to a receptor. Shadow-flickering will only occur when the position of the turbine is between the sun and the receptor, and only when the turbine is operating and the sun is shining.

Noise levels are affected by various factors such as topography, land use, vegetation cover, roads, etc. According to the noise specialist, the following landscape features are expected to have an impact on existing ambient noise levels, as well as the occurrence of shadow flicker:

- **Topography** – The site is located in an undulating, rural landscape and, as a result, has the potential to absorb noise and limit shadow-flicker.
- **Roads** – Mainly farm roads (i.e. dirt roads) occur within the area.
- **Land use** – The main land use within the area is agriculture which contributes to the background ambient noise levels. The three operating wind farms are also contributing to the background ambient noise levels.
- **Residential areas** – The following four residential areas occurs within the landscape, namely: Oyster Bay (10 km to the south-east), Humansdorp (18 km to the north-east) St Francis Bay (24.5 km to the east) and Cape St Francis (26 km to the east).
- **Ground conditions and vegetation** – Untransformed areas are well vegetated and provides relatively soft ground conditions in terms of noise propagation. Forested areas also occur within the landscape.

Based on the above considerations, a rural ambient noise level of 45 dB(A) has been accepted as the baseline for the local area. However, 13 receptors are located within the Tsitsikamma Community Wind Farm and would be experiencing noise levels exceeding 45 dB(A) due to the operational turbines. Therefore, the noise level nature of this area cannot be considered rural.

7.11.2 Site sensitivity

Since South Africa does not have legislation or guidelines enforcing minimum distances between turbines and dwellings, a minimum buffer distance[10] of 500 m was applied to all houses and places of work within a radius of 3 km of the proposed turbine locations as shown in Figure 7.27 below. The 13 receptors within the Tsitsikamma Community Wind Farm were however assessed as sensitive receptors (see Figure 7.28).

[10] Internationally, 500 m is considered an acceptable setback distance between turbines and dwellings and have also been specified in South African environmental authorisations for wind farms.

Figure 7.27: Location of sensitive receptors on the Impofu West site with a 500 m No-Go buffer applied (3E, 2018)

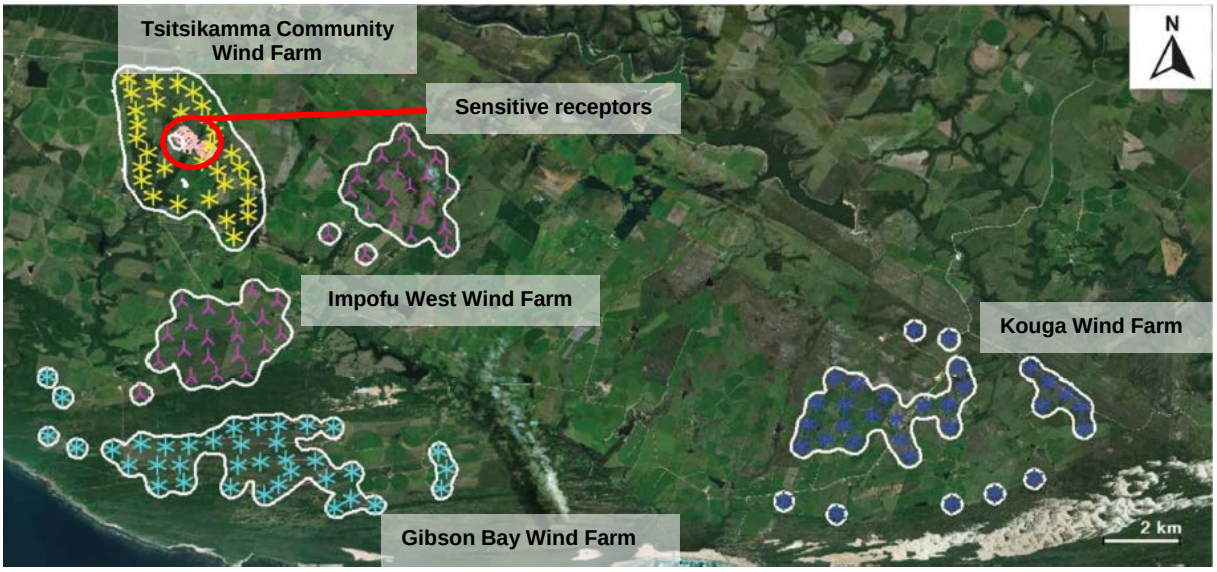

Figure 7.28: Location of sensitive receptors within the 45dB(A) contour (indicated with the white line) (3E, 2018)

No national or local maximum shadow-flicker thresholds exist for South Africa. For this reason, a limit of 30 hours per year was calculated after taking into consideration international shadow-flicker thresholds[11]. Based on the modelling, it was determined that 18 sensitive receptors are currently experiencing an exceedance in shadow flicker of the 30 h/yr threshold at the Tsitsikamma Community Wind Farm. A further 22 receptors (mainly dwellings), in addition to the 18 currently being impacted, would however experience an exceedance of the

[11] This limit is also used in the World Banks Environmental, Health and Safety Guidelines for Wind Energy.

30 h/yr threshold from the proposed Impofu West Wind Farm should it be constructed (seen Figure 7.29). It must be noted the 22 receptors that would potentially be impacted are all within the Impofu West Wind Farm site.

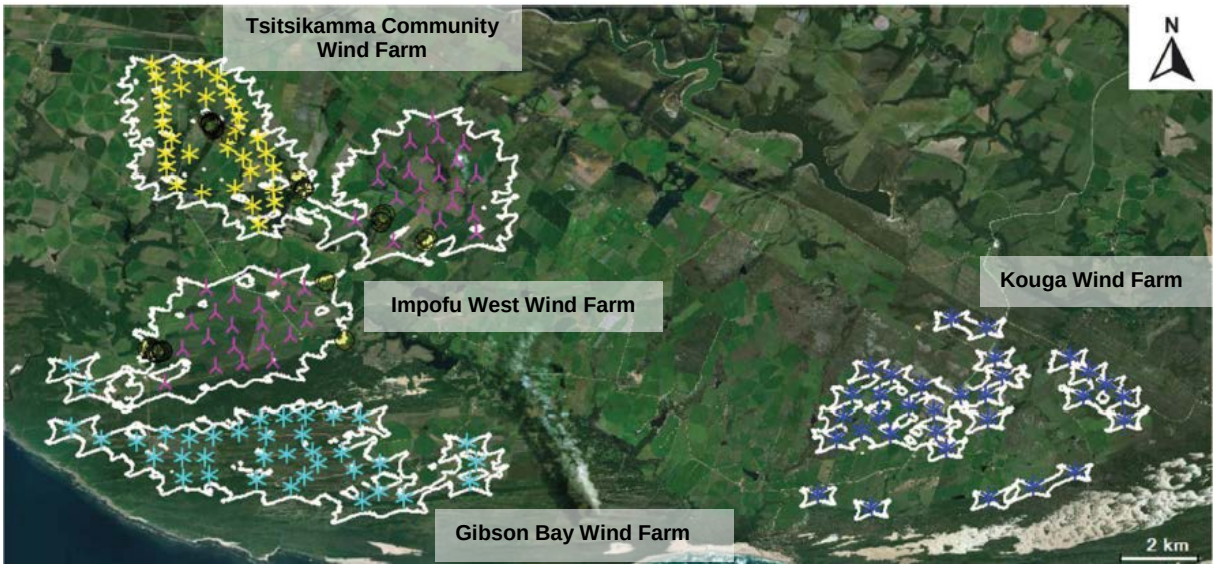

Figure 7.29: Shadow contour map showing receptors that would experience an exceedance of the shadow-flicker limit (white line: 30 h/yr contour line; black circles: sensitive receptors) (3E, 2018)

7.11.3 Potential impacts

Construction related noise would result from the equipment being used (e.g. excavators, graders, bulldozers, etc.) and the activities undertaken (e.g. excavations, batching plants, etc.), as well as traffic on site, and to and from the site. It is expected that the volume and type of traffic generated, would vary during the construction period, depending on the activities undertaken at a specific point in time. As such, it is anticipated that noise related impacts during the construction phase would be **minor negative** with and without mitigation. In addition, the following mitigation measures are required:

- Mechanical equipment with lower sound power levels shall be selected to minimise impact;
- Construction workers and personnel shall wear hearing protection when required;
- Vehicles and machines shall be properly serviced and well maintained;
- Vehicles must adhere to speed limits;
- A proactive warning system shall be established to inform affected community members of the planned construction activities with an estimation of the commencement date and duration of each activity; and
- A grievance procedure shall be established whereby noise complaints by affected community members are recorded and responded to.

It is not expected that Impofu West Wind Farm would exceed the 45 dB(A) noise level threshold required for rural areas at any of the sensitive receptors. The expected impact of increased noise levels during the operational phase is considered to be **negligible negative** with and without mitigation. No mitigation measures are required.

Noise related impacts during the decommissioning phase would be similar to those experienced during the construction phase.

The 22 additional receptors identified as potentially experiencing shadow flicker from the operational Impofu West Wind Farm is based on a conservative assessment of shadow flicker. This impact is however expected to be **minor negative** without mitigation and can be reduced to **negligible negative** by implementing the following mitigation measures:

- A 500 m buffer between turbines and dwellings shall be applied to all turbines (already implemented in the current design layout);
- Measurements shall be taken of the actual shadow-flicker impact at the identified sensitive receptors given the assessment used conservative assumptions and it is likely the actual impacts will be less than modelled; and
- If exceedances have been determined, blinds shall be installed in the affected windows and/or trees and evergreen vegetation (indigenous) shall be planted between the turbines and the affected windows.

7.11.4 No-Go alternative

Should the Impofu West Wind Farm not be developed, the noise levels and shadow-flicker impacts would remain similar to the baseline scenario as described in Section 7.11.1

7.11.5 Conclusion and recommendations

The project site is in a rural landscape with three operating wind farms in the local area, namely: Kouga Wind Farm, Gibson Bay Wind Farm and Tsitsikamma Community Wind Farm. During the construction phase noise related impacts are expected to occur with a significance rating of minor negative without mitigation. This impact will however be negligible negative during the operational phase.

Shadow-flicker impacts are considered relatively easy to mitigate and anticipated to be minor negative without mitigation. This impact can however be reduced to negligible negative by taking measurements after the turbines have been constructed, to confirm if sensitive receptors are experiencing exceedances of 30 hours per year limit and as a result in need of the mitigation measures.

7.12 Visual

The information included in this section is drawn from the Visual Specialist Report attached as Appendix C10, undertaken by Mr. Bernard Oberholzer and Mr. Quinton Lawson (Oberholzer and Lawson, 2018).

7.12.1 Baseline information

Table 7.9 provides a description of the landscape and scenic features identified for the Impofu West Wind Farm site, as well as potential receptors identified by the specialist.

Table 7.9 Landscape and scenic characteristics of the Impofu West Wind Farm site

Characteristic	Description
Landscape setting	The site is located in the Eastern Cape, approximately 18 km west of Humansdorp, on a broad flat coastal plain. The site lies south of the N2 National Road, and R102 Main Road. The area, known for its dairy farming, is flanked on the north-western boundary by the Tsitsikamma Community Wind Farm and Gibson Bay Wind Farm in the south-east and south-west.
Geology and landforms	The study area is a flat to gently undulating peneplain, underlain by quartzitic sandstones of the Cedarberg and Peninsula Formations of the Table Mountain Group (Geological Survey, 2011). The southern section of the site has aeolian sand that has formed hardened aeolianite in places (mainly the parallel dune ridges). The approximate elevation ranges from sea level in the south to 200 m in the north. The peneplain has been dissected by a number of rivers, including the Krom River to the north-east of the site, forming a deep ravine. The Klipdrift River runs through the middle of the site. A number of dams have been constructed on these rivers and their tributaries, of which the Impofu Dam (on the Krom River) is the largest.

Characteristic	Description
Vegetation cover and land use	Most of the indigenous vegetation has been replaced by pasture and fodder for the dairy farming in the area. Copses and avenues of exotic trees such as gums, pines and beefwoods, have historically been planted around the farmsteads. Infestations of black wattle have invaded large areas, mainly along the river courses. A dense indigenous dune forest does however occur along the coastline and in the dune slacks. There are existing wind farms adjacent to the Impofu West Wind Farm along with a number of other wind farms in the wider surroundings (i.e. Kouga Wind Farm and Jeffreys Bay Wind Farm).
Scenic features and receptors	The study area has a pleasing rural character with green pastures grazed by cattle and sheep, interspersed by crops and wooded ravines along the stream courses. There are numerous farmsteads, both on the site and in the immediate surroundings. The nearest settlements are Oyster Bay (10 km to the south), Humansdorp (18 km to the east) and Clarkson (20 km to the west). There are several nature reserves and game farms in the general area, specifically, the Jumanji Game Farm (10 km to the north) and Thaba Manzi Game Farm (10-15 km). Other receptors would be the users of the N2 National Road and the R102 Main Road approximately 5 km away.

7.12.2 Site sensitivity

Site sensitivity with regards to potential visual impacts, are determined based on the following considerations:

- **Visibility** – the degree to which the turbines are visible is subject to foreground topography.
- **Visual exposure** – the geographic area within which the project would be visible (i.e. the wind farm would be located on a visually exposed plain while the Kareedouwberg ridge provides a view shadow to some areas to the north-west).
- **Landscape integrity -** visual quality tends to be enhanced by scenic or rural quality and intactness of the landscape (including the absence of other visual intrusions).
- **Visual sensitivity –** mainly determined by topographic features such as ridgelines (e.g. the Krom River ravine is a notable scenic feature), but also cultural landscapes (e.g. scenic value of a traditional farmed landscape).
- **Visual absorption capacity (VAC)** – the potential of the landscape to screen (i.e. absorb) views of the wind farm project.

Table 7.10 below provides a summary of the sensitive features that were identified for each of the visual criteria explained above, which is also visually shown in Figure 7.30.

Table 7.10 Site sensitivity with regards to various visual criteria (Oberholzer and Lawson, 2018)

Visual criteria	Description	Wind turbines	Related infrastructure
Visibility of facilities	The wind farm would be visible from a number of farmsteads, the N2 and R102 routes, and part of the Huisklip Nature Reserve.	High	Low
Visibility of lights at night	Navigation lights on turbines, security lighting at substation and operational and maintenance buildings.	Medium	Medium
Visual exposure	The wind farm would be located on a visually exposed plain, but will also be partly screened by landforms to the north-west.	High	Low

Visual criteria	Description	Wind turbines	Related infrastructure
Landscape integrity	The site has already been altered by the existing wind farms in the area, while still maintaining a rural farming character.	Medium	Medium
Landscape/ visual sensitivity	The Kareedouwberg ridgeline, Krom River ravine, nature reserves, farmsteads, N2 and the R102 route have heritage and scenic significance.	High	Low
Visual absorption capacity	The site has a low visual absorption capacity due to its location on a plain. The coastline is however partly screened by the dune topography.	High	Medium

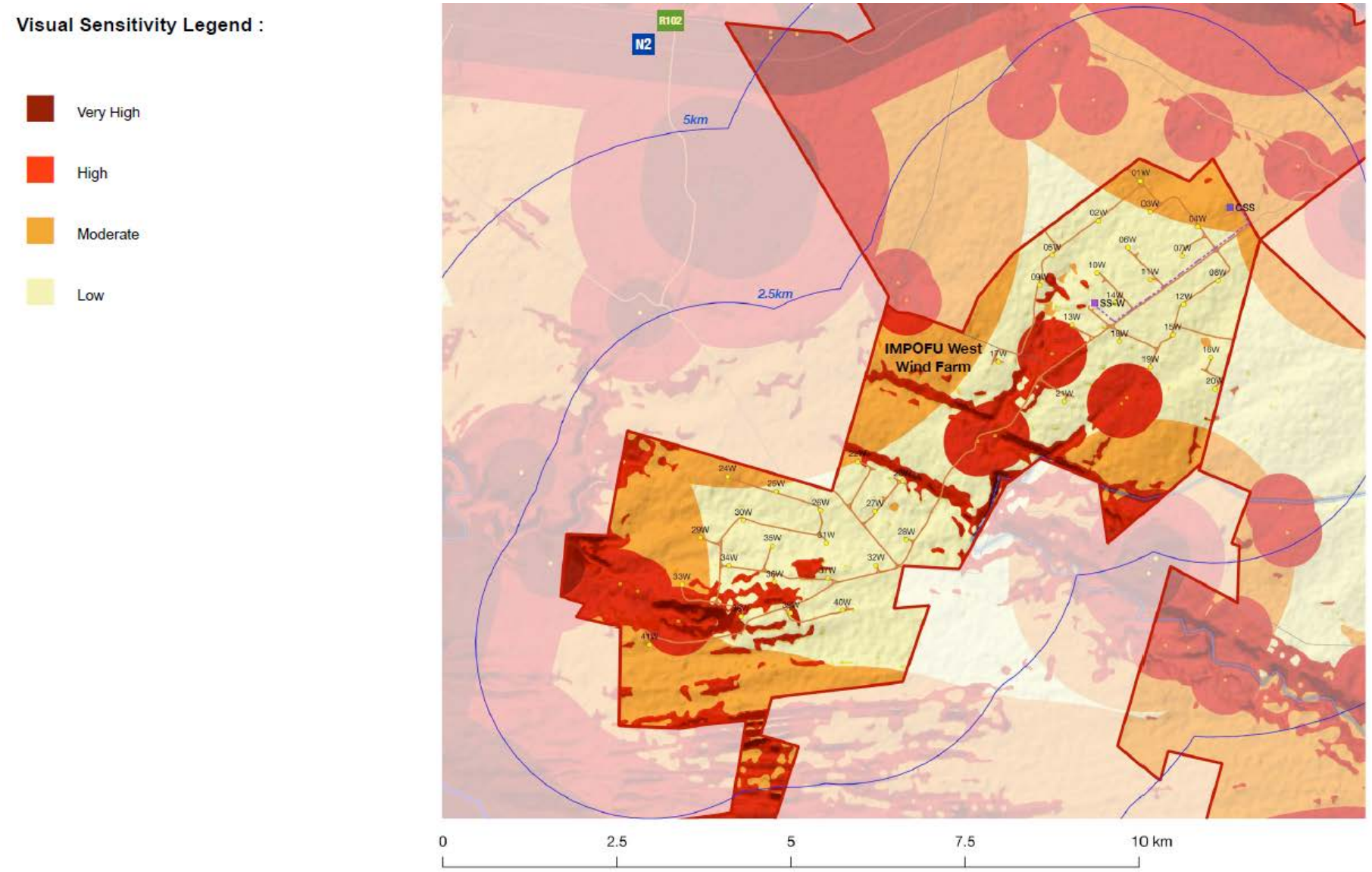

Figure 7.30 : Visual sensitivity map

7.12.3 Potential impacts

The following potential visual issues were identified by the specialist and are discussed in terms of their applicability to the construction, operational and decommissioning phases:

- Potential visual intrusion of construction activities on the rural landscape and scenic resources.
- Potential scarring in the landscape caused by earthworks for access roads and assembly platforms, particularly on the steeper slopes.
- Dust and noise during construction from heavy machinery, truck traffic and cranes.
- Potential visual effect of wind turbines on the rural/cultural landscape and on surrounding farmsteads/settlements.
- Potential shadow flicker caused by wind turbines to nearby receptors in the early morning and late afternoon (see Section 7.11).
- Potential visual clutter of on-site substation, operations and maintenance structures and connecting powerlines.
- Potential visual intrusion caused by navigation lighting from turbines and security lighting at substations and operational and maintenance structures.

During the construction phase, it is anticipated that the impacts on the rural sense of place would be of **moderate negative** significance due to visual intrusion, construction traffic, cranes, dust and noise for wind turbines and related infrastructure. The significance of this impact can however be reduced to **minor negative** by implementing the following mitigation measures:

- The construction camp, batching plant and related storage/stockpile areas shall be located as far as possible in unobtrusive positions in the landscape, and where possible away from provincial roads.
- Existing roads and tracks are to be used as far as possible, and where new access roads are required these are to be as narrow as possible.
- Construction camps shall be clearly demarcated and limited in size to only that which is essential.
- The substations are also to be located in unobtrusive positions, and are to be screened by earth berms and tree planting.
- Dust suppression and litter control measures shall be implemented.
- Adherence to the EMPr, shall be strictly monitored by an Environmental Control Officer (ECO).
- Construction activities are to be restricted to normal working hours where possible, or alternately conform with the mitigation measures of the Noise Impact Assessment.

During the operational phase, the Impofu West Wind Farm has the potential to visually intrude on the rural landscape and surrounding receptors by means of the wind turbines, associated infrastructure such as the substation and lighting during the night. This impact has a **major-moderate negative** significance rating with regards to the turbines pre- and post-mitigation since mitigation through avoidance and micro-siting has already been undertaken during the screening process.

The significance of the impact associated with related infrastructure and lights are however both rated as **moderate negative** without mitigation. Impacts related to infrastructure can be reduced to **minor negative** and impacts from lighting reduced to **moderate-minor negative** by implementing the following mitigation measures:

- Internal powerlines shall be placed underground.
- The substation and operational and maintenance buildings shall be located in unobtrusive, low-lying positions, away from main roads or district roads, and avoid ridgelines or hillcrests. Alternatively, earth berms and tree / or planting shall be used as visual screens.
- Existing roads shall be used as far as possible, and new roads shall be kept as narrow as possible.
- External signage kept to a minimum and billboard type signs avoided.
- Security and area lighting at substations and operational and maintenance buildings shall be fitted with reflectors to minimise light spillage. Low-level bulkhead lights shall be used in preference to lamp standards.

During the decommissioning phase, the remaining roads, platforms and concrete slabs would have a **moderate minor negative** visual effect on the landscape. This impact can however be reduced to **minor negative** by implementing the following mitigation measures:

- All wind turbines shall be removed and building structures demolished or recycled for new uses.
- Hardened platform areas and access roads no longer required, shall be ripped and regraded.
- Exposed or disturbed areas shall be revegetated or returned to grazing pasture or natural vegetation to blend with the surroundings.

7.12.4 No-Go alternative

The No-Go alternative implies that the landforms and skyline would remain visually intact. For this reason, the anticipated impact is rated as neutral.

7.12.5 Conclusion and recommendations

The proposed wind farm would have a relatively minor visual influence on the coastline and protected areas, such as nature reserves, in the general area, due to distance and their location within a view shadow. The layout of the proposed wind turbines largely succeeds in avoiding most constraints for this area due to the removal and micro-siting of the most problematic turbines where possible during the screening process. As a result, no further mitigation of the wind farm is possible without removal of some turbines from the overall complement. This impact is therefor considered to be of major to moderate (negative) significance with and without mitigation.

The potential visual impact significance of related infrastructure, such as the substation and operational and maintenance buildings, as well as lighting, would be moderate negative before mitigation and moderate minor negative with mitigation.

The height of the wind turbines could possibly be taller in some cases than the existing wind turbines of adjacent wind farms. This generally tends to have only a marginal effect on the viewshed and overall change in character to the area. Furthermore, the fact that the proposed Impofu West Wind Farm could potentially be dismantled during the decommissioning phase in the long term, and the site restored to more or less its original state, is a positive consideration.

It is the opinion of the Visual Specialists that the preferred Impofu West Wind Farm layout does not present a potential fatal flaw in visual terms, given the changes undertaken to date during the screening process resulting in the current preferred layout.

7.13 Summary and conclusions

Table 7.7 provides a summary of the potential environmental impacts that have been identified for further consideration in the EIA Phase. The impact assessment and associated mitigation measures may be revised based on further detailed specialist investigation.

Table 7.11: Summary of potential impacts per environmental aspect and requirements for inclusion in the EIA Phase

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
Terrestrial ecology	Construction impacts on vegetation and plant SCC	Moderate (-)	Minor (-)	• Pre-construction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads. • Minimise the development footprint as far as possible and rehabilitate disturbed areas after construction. • Avoidance of identified areas of high fauna importance at the design stage (as achieved in current layout). • Search and rescue for reptiles and other vulnerable species during construction – before areas of intact vegetation are cleared. • Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase. • Environmental induction for all staff and contractors on site. • Development of an Open Space Management Plan to inform the Environmental Management Programme to favourably manage the facility and surrounding area for fauna. • Where appropriate, design roads and other infrastructure to minimise faunal impacts and allow fauna to pass through or underneath these features. • No electrical fencing within 20 cm from the ground to allow tortoise to move through safely. • Locate temporary-use areas such as construction camps and lay-down areas in previously disturbed areas. • Avoid impact to restricted and specialised habitats such as pans, wetlands and dune fields (achieved in the current layout). • Alien clearing and continued management in and around those parts of the development footprint that are within natural to near-natural vegetation to improve habitat quality and limit further spread of alien plants. • Implement an alien management plan as part of the project budget for at least 5 years after decommissioning. • Regular monitoring of alien plants within the disturbed areas for at least 2 years after decommissioning or until alien invasive plants are no longer a problem at the site. • Alien clearing should use best practice methods for species concerned. • Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to commencement of decommissioning activities. • All hazardous material should be stored in the appropriate manner to prevent contamination of the site. All accidental spills should be cleaned up appropriately. • Vehicles must adhere to low speed limits to avoid collision with slow moving species e.g. snakes and tortoises. • Above ground infrastructure must be removed from the site. If it does not pose a risk, below ground infrastructure (e.g. cabling) can be left in place to minimise disturbance, however decommissioning must be in accordance with the facility's decommissioning and recycling plan.	In
	Direct and indirect faunal impacts during construction	Minor (-)	Minor (-)		
	Operational impacts on fauna	Moderate (-)	Minor (-)		
	Impacts on CBAs during operation	Moderate (-)	Minor (-)		
	Alien plant invasion following decommissioning	Minor (-)	Minor (-)		
	Faunal impacts due to decommissioning	Minor (-)	Minor (-)		

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
Aquatic ecology	During construction vegetation near or within watercourses will be disturbed which may contain species of special concern	Minor (-)	Negligible (-)	• A final pre-construction walkdown is to be conducted as part of a Plant Search and Rescue plan, including PNCO / NFA species, with the appropriate permits in place from DEDEAT and DAFF. • A post authorisation walkdown is to be conducted to assist with the development of the stormwater management plan and wetland rehabilitation and monitoring plan. The stormwater management plan must detail the structures and actions that must be installed to prevent the increase of surface water flows directly into any natural systems. It must also include the details for effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks. • All alien plant re-growth, which is currently high within the greater region must be monitored and should it occur, these plants should be eradicated within the project footprints and especially in areas near the proposed crossings. • Where any roads and crossings will be upgraded, the following applies: - All pipe culverts must be removed and replaced with suitably sized box culverts, where road levels are raised. - River levels, regardless of the current state of the river / water course will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a post EIA walkdown, prior to commencement of the construction phase. - Approach road embankments especially where large cut and fill areas will be required must be rehabilitated during the construction process, to minimise erosion.	In
	Construction could result in the loss of wetlands with High sensitivity within the site and/or any required access road upgrades (e.g. DR01774)	Minor (-)	Negligible (-)		
	Loss of riparian systems and watercourses during construction within the site and/or any required access road upgrades (e.g. DR01774)	Minor (-)	Negligible (-)		
	During construction, contamination of watercourses due to waste generation and accidental spills of materials stored and handled with impacts on water quality	Minor (-)	Negligible (-)		

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
	Impact on aquatic systems through possible increase in surface water runoff - downstream erosion and sedimentation during operation	Minor (-)	Negligible (-)	- Suitable stormwater management systems must be installed and monitored during the first few months of use. Any erosion / sedimentation must be prevented. - If any of the delineated wetlands occur within 50 m of the existing crossings, then a detailed monitoring plan must be developed. • During construction: - Employ good housekeeping practices. - Storage and handling of materials as per industry specifications an in demarcated areas that are contained within berms / bunds. - Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. - All construction camps, lay down areas, batching plants or areas and any stores should be more than 50 m from any demarcated watercourses. - Emergency plans must be in place in case of spillages onto road surfaces and watercourses. - Adequate provision of ablution facilities. - No stockpiling should take place within a watercourse, all stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	
Bats	During construction some very limited foraging habitat will inevitably be destroyed to clear ground for the Wind Farm	Negligible (-)	Negligible (-)	• Adjust turbine layout so that turbines that are now situated in the updated bat No-Go and high sensitivity areas are moved to be situated outside these areas. • Rehabilitation of cleared vegetation areas where possible at areas such as laydown yards. • Reducing blade movement at selected turbines and high-risk bat activity times and weather conditions. • Use lights with low sensitivity motion sensors. • Ensure all lights are down hooded and connected to motion sensors (where safe to do so), to minimise light pollution.	In
	Bat mortalities due to moving turbine blades during operation	Major (-)	N/A until 12-month monitoring is complete		
	Increased bat mortalities due to light attraction during operation	Moderate (-)	Negligible (-)		
Avifauna	Destruction of bird habitat during construction	Minor-Moderate (-)	Minor-Moderate (-)	• Conduct Avifaunal site walk down to confirm final turbine layout and identify any sensitivities that may arise between the EIA and construction phase. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, to avoid any unnecessary impact on the receiving environment. • Apply 6 km No-Go buffer from Martial Eagle nest (achieved in current layout). • Monitoring of bird breeding status of Martial Eagles in all seasons prior and during construction. • Developer to provide mitigation contingency budget for operational phase. • Provide overhead conductors or earth wires with Eskom approved anti-bird collision line marking devices to make cables more visible.	In
	Disturbance of birds during construction	Negligible (-)	Negligible (-)		
	Disturbance of birds during operation	Minor (-)	Minor (-)		
	Displacement of birds from site during operation	Negligible (-)	Negligible (-)		

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
	Bird fatalities through collision with wind turbine blades	Moderate (-)	Moderate (-)	• Pylons or poles of any overhead power line must be designed according to Eskom approved bird friendly designs. • If Blue Crane turbine or power line collision fatalities occur as a result of livestock feeding points once the facility is operational, this will need to be mitigated, probably by restricting farmers from feeding too close to turbines and power lines. Landowners should be made aware of this possibility at the outset of the project.	
	Bird collision and electrocution on overhead powerlines during operation	Minor (-)	Negligible (-)		
Agriculture	Loss of agricultural land use	Minor (-)	Minor (-)	• Ensure that construction footprint has minimal impact on productive land and ensuring that all No-Go areas are avoided (achieved in current layout). • Get input from farmers and landowners on how to best minimise impact on their land (achieved in current layout). • Implement cattle grids to mitigate problems of gates being left open • Apply systems of stormwater run-off control • Facilitate revegetation and rehabilitation of denuded areas. • Re-spread stripped topsoil for rehabilitation purposes. • Obtain input from farmers and landowners into the design phase on how to increase usefulness of turbine access roads for their farming operations (achieved in current layout).	In
	Discontinuation of farming activities	Negligible (-)	N/A		
	Interference with farming operations	Negligible (-)	Negligible (-)		
	Damage to natural agricultural resource base.	Negligible (-)	Negligible (-)		
	Depletion of potential agricultural water resources	Negligible (-)	N/A		
	Increased financial security for farmers	Moderate (+)	N/A		
	Improvements to shared infrastructure	Minor (+)	Minor (+)		
	Improved farm security	Minor (+)	N/A		
Socio-economic	Temporary stimulation of the national and local economy	Moderate (+)	Moderate (+)	• Increasing of local procurement practices and promoting the employment of people from local communities, as far as feasible. • Procurement of construction materials, goods and products from local suppliers were feasible. • Making use of local companies and suppliers, particularly SMME's and BBBEE compliant enterprises, where feasible. • Identification of potential skills that could be sourced in the area. • Recruiting of local labour as far as feasible. • Facilitating knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases. • Employ labour intensive methods in construction where feasible • Establishing vocational training programmes and/or bursary schemes and/or apprenticeship programmes for the local labour force to promote the	In
	Temporary increase of new employment opportunities in the national and local economies	Moderate (+)	Moderate (+)		
	Contribution of skills development programmes	Minor (+)	Moderate (+)		
	Temporary increase in household earnings	Minor (+)	Minor (+)		

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
	Temporary increase in government revenue through higher personal income tax, VAT, companies tax	Minor (+)	Minor (+)	development of skills required by the wind farm and thus provide for the opportunity for these people to be employed at other similar facilities. • Implementing mitigation measures proposed by the visual and noise specialists. • Preventing disturbances to natural areas outside the development footprint required for the wind farm. • Heavy vehicles travelling on secondary roads should adhere to low speed limits to minimise noise and dust pollution. • Dust pollution mitigation measures must be implemented. • Ensure a community liaison office is active in the nearby towns and ensure adherence to strict labour recruitment practices. • Scheduled transportation services between the construction site and area of residence to control the movement of workers between the site and areas of residence. • Establish a management forum comprising of key stakeholders to monitor and identify potential problems that may arise due to the influx of job seekers to the area. • Assign a dedicated person to deal with complaints and concerns of affected parties. • Assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations, where feasible. • Implementing traffic control and management measures (construction activities signage). • Managing maintenance hours over weekends and outside business hours during the week. • Investigating options to provide job opportunities to retrenched employees of nearby tourism facilities or assisting them through the enterprise development programme and/or social development funding allocations prescribed by government. • Investigating potential partnerships with tourism establishments to support affected families and ensure that the aid given to them is retained. • Engaging with relevant local authorities (and provincial if necessary) regarding the development of the wind farm and their ability to meet the additional demands on social and basic services created by the influx of workers. • Assisting local municipalities to ensure that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations. • Implementing a recruitment strategy. • Developing transportation services between the construction site and area of residence.	
	Negative changes to the sense of place	Minor (-)	Minor (-)		
	Impact on the local tourism industry during construction	Negligible (-)	Negligible (-)		
	Temporary increase in social conflicts associated with the influx of people	Minor (-)	Negligible (-)		
	Impact on economic and social infrastructure	Minor (-)	Negligible (-)		
	Impact on actual and perceived property and land values in the immediately affected area	Minor (-)	Negligible (-)		
	Sustainable increase in production and GDP nationally and locally	Moderate (+)	Moderate (+)		
	Sustainable employment positions nationally and locally	Moderate (+)	Moderate (+)		
	Sustainable increase in national and local government revenue	Moderate (+)	Moderate (+)		
	Skills development of permanently employed workers	Moderate (+)	Moderate (+)		
	Negative changes to the sense of place	Negligible (-)	Negligible (-)		

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
	Improvement of the livelihoods of the household's dependant on the local agricultural sector	Moderate (+)	Moderate (+)	• Developing a conflict/complaints management and resolution plan. • Enterprise Development and Socio-economic Development initiatives outlined in the REI4P bid must be effectively implemented. • Consult owners of the game farms during the design and construction process to take into account their requests with respect to mitigation of long term visual disturbances.	
	Improved standard of living for benefitting households during the operational phase	Minor (+)	Minor (+)		
	Local economic and social development benefits derived from the wind farm's operations	Moderate (+)	Moderate (+)		
	Negative impact on the local tourism industry	Minor (-)	Negligible (-)		
	Provision of electricity for future development	Moderate (+)	Moderate (+)		
	Impact on the livelihoods of the households dependant on the local tourism	Minor (-)	Negligible (-)		
Palaeontology	During construction, damage, disturbance and destruction of fossil heritage	Negligible (-)	Negligible (-)	• Recording and sampling of significant fossils by a professional palaeontologist and safeguarding and reporting any potential fossil finds to the ECPHRA.	Out
Archaeology	Impact on pre-colonial cultural landscape along 5 km wide coastal strip	Moderate (-)	Minor (+)	• It is recommended that archaeological monitoring be undertaken in the following areas: - The area south of the white dashed line as indicated in Figure 6 of the Phase 1a AIA (Nilssen 2018). - The area within the white dashed ellipse as indicated in Figure 6 of the Phase 1a AIA (Nilssen 2018). • Archaeological monitoring should be supervised by a suitably qualified and accredited professional archaeologist during the construction phase of the development.	In
	Impact on surrounds of quarry with in situ ESA and MSA stone artefacts	Major (-)	Minor (+)		
Noise and shadow flicker	Construction noise	Minor (-)	Minor (-)	• Mechanical equipment with lower sound power levels shall be selected to minimise impact. • Construction workers and personnel shall wear hearing protection when required.	In

Environmental aspect	Potential impact	Significance of impact		Potential Mitigation Measures	Scope in / out of EIA
		Pre-mitigation	Post-mitigation		
	Operational noise	Negligible (-)	Negligible (-)	• Vehicles and machines shall be properly serviced and well maintained. • Vehicles must adhere to speed limits. • A proactive warning system shall be established to inform affected community members of the planned construction activities with an estimation of the commencement date and duration of each activity. • A grievance procedure shall be established whereby noise complaints by affected community members are recorded and responded to. • A 500 m minimum buffer between turbines and dwellings shall be applied to all turbines. • Measurements shall be taken of the actual shadow-flicker impact at the identified sensitive receptors. • Use well maintained equipment with lowest noise levels, speed limit for vehicles, spread works across the site. • If exceedances have been determined, blinds shall be installed in the affected windows and/or trees and evergreen vegetation (indigenous) shall be planted between the turbines and the affected windows.	
	Decommissioning noise	Minor (-)	Minor (-)		
	Shadow-flicker impact during the operational phase	Minor (-)	Negligible (-)		
Visual	Visual intrusion on the rural landscape and scenic resources during the construction phase	Moderate (-)	Minor (-)	• The construction camp, batching plant and related storage/stockpile areas shall be located as far as possible in unobtrusive positions in the landscape, and where possible away from provincial roads. • Existing roads and tracks are to be used as far as possible, and where new access roads are required these are to be as narrow as possible. • Construction camps shall be clearly demarcated and limited in size to only that which is essential. • The substations are also to be located in unobtrusive positions, and are to be screened by earth berms and tree planting. • Dust suppression and litter control measures shall be implemented. • Adherence to the Environmental Management Programme (EMPr), shall be strictly monitored by an Environmental Control Officer (ECO). • Construction activities are to be restricted to normal working hours where possible, or alternately conform with the mitigation measures of the Noise Impact Assessment. • Substations and operational and maintenance buildings to be screened by earth berms and tree or hedge planting. • Internal powerlines shall be placed underground, where possible. • External signage kept to a minimum and billboard type signs avoided. • Security and area lighting at substations and operational and maintenance buildings shall be fitted with reflectors to minimise light spillage. • Low-level bulkhead lights shall be used in preference to lamp standards. • All wind turbines shall be removed and building structures demolished or recycled for new uses. • Hardened platform areas and access roads no longer required, shall be ripped and regraded. • Exposed or disturbed areas shall be revegetated or returned to grazing pasture or natural vegetation to blend with the surroundings.	In
	Visual intrusion of the wind turbines on the rural landscape, settlements, scenic resources and overall sense of place during operational phase	Moderate-major (-)	Moderate-major (-)		
	Visual intrusion of associated infrastructure on the rural farming landscape	Moderate (-)	Minor (-)		
	Visual intrusion of lights at night on dark skies	Moderate (-)	Moderate-Minor (-)		
	Visual intrusion of remaining structures and access roads on the rural landscape during decommissioning phase	Moderate (-)	Minor (-)		

8 Cumulative impact assessment

The cumulative impacts of the Impofu West Wind Farm are an important consideration for the project given the context of the current wind farm proposals including Impofu North and Impofu East Wind Farms, as well as proposed wind farm projects, within the existing renewable energy landscape.

Cumulative impact, in relation to an activity, means the past, current and reasonable foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonable foreseeable impacts eventuating from similar or diverse activities (NEMA EIA Reg 1).

8.1 Approach

A number of scenarios have been described to show how this project in conjunction with the past, present and future wind farm projects in the area has the potential for cumulative impacts on the same environmental receptors. The area of influence of the cumulative study was a 30 km radius around the Consolidated Impofu Wind Farm site and this was agreed at the Pre-Application meeting with DEA (17 October 2017). It was agreed that for future wind farms, only those that have a valid environmental authorisation and/or are currently under construction should be included as there is a level of certainty that they will be developed. The increasing levels of impacts from past, present and future wind farm projects that have informed the cumulative assessment as part of the environmental impact assessment process are as follows:

A Existing baseline which includes the operational Kouga, Gibson Bay, Tsitsikamma and Jeffrey's Bay Wind Farms. Specialists have considered the baseline in their respective baseline descriptions in Section 7.

B Assessment of impacts of the Impofu West Wind Farm on the existing baseline. Specialists assessment of these impacts are presented in Section 7.

C Assessment of impacts from Impofu West Wind Farm on the baseline, in combination with the impacts of Impofu North and Impofu East Wind Farms. **This is SCENARIO 1** and the specialists assessment of this is presented in Table 8.2 in this Section.

D Assessment of cumulative impacts from all three Red Cap wind farms and associated infrastructure on the baseline in addition to the proposed Oyster Bay, Banna Ba Pifhu and Ubuntu Wind Farms which are within a 30 km radius from the consolidated site and have a valid environmental authorisation. **This is SCENARIO 2** and the specialists assessment of this is presented in Table 8.2 in this Section.

The various levels forming the impact assessment process are conceptually represented on Figure 8.1 below. The projects and their details are included Table 8.1 and depicted spatially on a map as Figure 8.2.

Table 8.1: Adjacent proposed wind farms considered in the EIA process

Scenario		Wind Farm	Turbines and MW	Status
1	2	Kouga Wind Farm and associated powerline	32 (2.5 MW); Total: 80 MW	Operational
1	2	Gibson Wind Farm and associated powerline	37 (3 MW); Total: 111 MW	Operational
1	2	Tsitsikamma Community Wind Farm and associated powerline	31 (3.075 MW); Total: 95.33 MW	Operational
1	2	Jeffreys Bay Wind Farm	60 (2.3 MW); Total: 138 MW	Operational
1	2	Impofu North Wind Farm	47 (3 – 5 MW); Total: 235 MW	Subject to a separate S&EIA process
1	2	Impofu West Wind Farm	41 (3 – 5 MW); Total: 205 MW	Subject of this S&EIA process
1	2	Impofu East Wind Farm	41 (3 – 5 MW); 205 MW	Subject to a separate S&EIA process
	2	Oyster Bay Wind Energy Facility and associated (4.3 km) powerline	41 (3.6 MW); Total: 140 MW (contracted capacity)	EA; Construction to commence in 2019
	2	Ubuntu Wind Energy Project	31 – 50; Total: 100 MW	EA
	2	Banna Ba Pifhu Windfarm Project	9 – 17; Total: 30.6 MW	EA

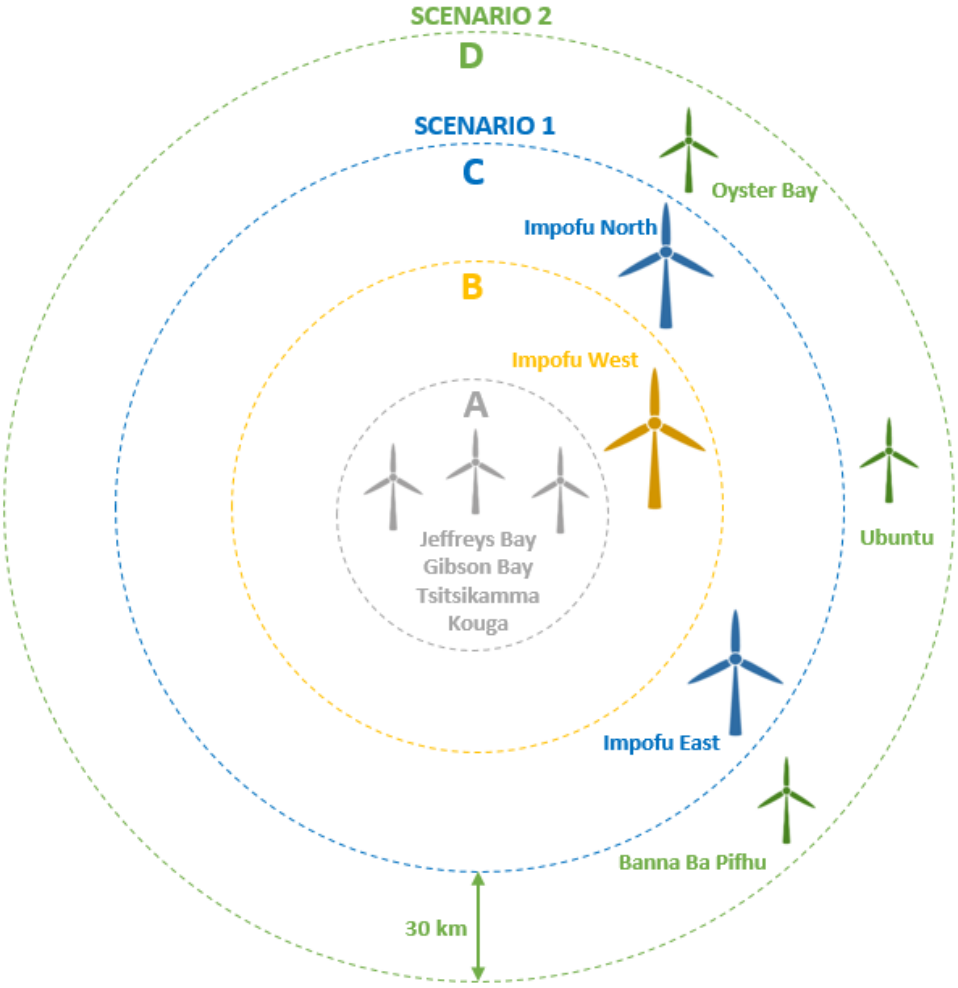

Figure 8.1: Impact assessment process

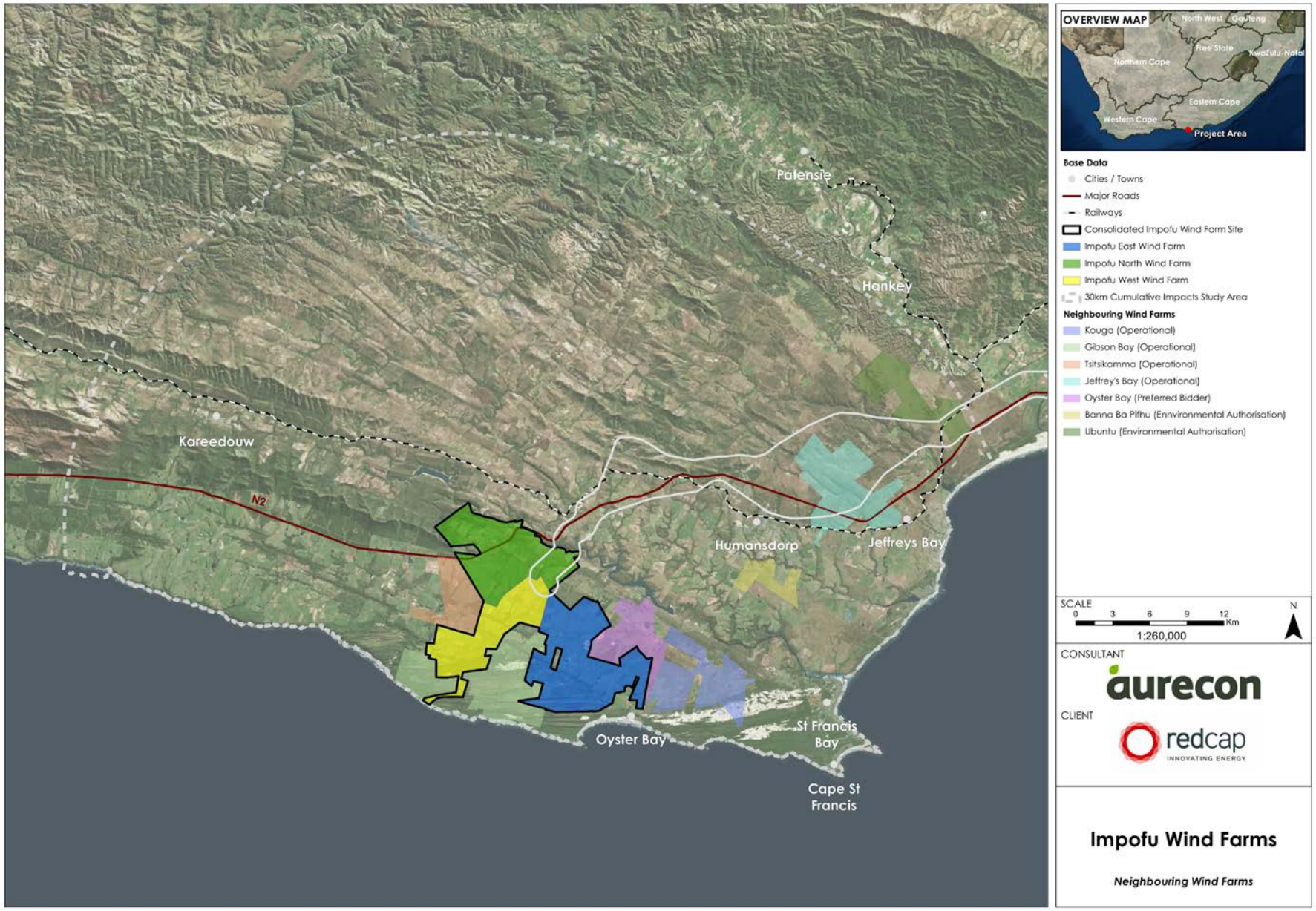

Figure 8.2: Existing and proposed adjacent projects considered in the impact assessment

The cumulative assessment involved the following:

1. Dissemination of the following to the specialists:
    a. A map showing the other identified existing and proposed wind farms in the study area.
    b. Environmental assessment reports for the identified wind farms.
    c. Turbine locations and specifications were sourced for identified wind farms where necessary e.g. for noise and shadow flicker modelling, and viewshed modelling.
2. Where available, pre-construction and operational monitoring data was also accessed by specialists (avifauna and bats specifically) to assist with identification of the baseline (as described in Section 7) as well as the impacts incurred by the other proposed wind farms that were identified. It should be noted that many of the specialists were also authors of some of the other studies in the area and therefore already have considerable knowledge of the area and access to monitoring data.
3. Specialists assessed the two cumulative scenarios in their studies and where applicable considered whether impacts would exceed an acceptable threshold relevant to their discipline. Where quantification was possible this was undertaken, and in some cases assumptions had to be made regarding the other wind farms where equivalent quantitative information was not available.
4. The specialists reported on the cumulative impacts in their reports (Appendix C) and a summary of the findings is presented below in Table 8.2.
5. Some specialists will further refine their assessments in the EIA Phase as discussed in the Plan of Study for the EIA (Section 10).

8.2 Assessment

The findings from the various specialist studies are summarised in Table 8.2, the impacts are detailed further in their specialist reports included in Appendix C.

Table 8.2: Summary of potential cumulative impacts

Aspect	Description of impact	Significance of cumulative impacts
Terrestrial ecology	Habitat loss and impact on broad-scale ecological processes	**Scenario 1 & 2 - Moderate negative** pre-mitigation reduced to **minor negative** post-mitigation The assessment focused on the vegetation types that were lost as a result of the developments and the level of transformation thereof. Regardless of vegetation type, the loss of vegetation also impacts ecological processes such as dispersal ability of fauna and flora and the ability of fauna and flora to respond to climatic fluctuations. It was found that the current development would potentially contribute to further cumulative impacts on habitat loss and fragmentation and negatively impact on broad-scale ecological processes such as dispersal and climate change resilience. However, the level of cumulative impact which can be attributed to wind farm development within the area remains low and the further contribution of the current development would also be low and is facilitated by the extensive avoidance that has been implemented by the developer. The total extent of habitat loss from all three Impofu Wind Farms is estimated at less than 20 ha of Tsitsikamma Sandstone Fynbos and less than 10 ha of Southern Cape Dune Fynbos, much of which is within highly degraded habitat. Given that there is still a relatively large remaining extent of Tsitsikamma Sandstone Fynbos, the habitat loss within this vegetation unit is not considered to be of high significance, especially as this is

Aspect	Description of impact	Significance of cumulative impacts
		spread as numerous small footprints across a large area and includes a large proportion of degraded areas.
Aquatic ecology	Impacts to the aquatic environment	**Scenario 1 & 2** – **Negligible negative** pre-mitigation to **minor positive** post-mitigation Only projects in the same catchment were considered applicable. Presently, no significant cumulative impacts with regard to the proposed turbine placement, hardstands and associated underground cabling were identified as these are also located outside of the identified No-Go areas. The potential cumulative impacts of this wind farm would only result should additional impacts proposed by the layout affect the aquatic environment. However, with the exception of the few internal crossings within already degraded areas, the wind farm itself would not add any additional impacts. The cumulative impact with regards to the additional internal and access roads will be assessed in greater detail in the EIA phase based on a final site inspection, but the project has the potential to have a positive impact should any of the watercourse crossings and wetland areas near the infrastructure required be rehabilitated.
Bats	Bat mortalities due to moving turbine blades	**Scenario 1 & 2** The specialist states that the preliminary calculations indicate that none of the cumulative scenarios are predicted to cause bat fatalities above the acceptable sustainability thresholds. . It is important to note that cumulative assessments are difficult to undertake with high accuracy. The bat specialist has a low confidence in the cumulative assessment at this time, as until the 12-month monitoring is complete the findings could change. Therefore, the cumulative assessment for bats will be updated during the remainder of the 12 months pre-construction study, as new data from this pre-construction study and from the operational monitoring on the nearby operating wind farms becomes available.
Avifauna	Destruction and alteration of habitat	**Scenario 1 – Moderate negative significance** Approximately 201.7 ha of habitat was transformed by the four operational facilities which is considered to be a relatively small amount of habitat transformation given the scale of the projects and amount of energy production. In addition, since these species (Denham's Bustard, Blue Crane, White-bellied Korhaan, White Stork) are using transformed habitat which is not particularly unique or limited in this area, this reduces the significance of this effect. It is estimated that the consolidated Impofu Wind Farms will transform approximately 151.2 ha. The effect of large dispersed infrastructure projects such as wind farms on birds is likely to be far more complex through factors such as habitat fragmentation, disruption of territories and other factors. These effects have however proven extremely difficult to measure. In order to apply a cautious approach the specialist concludes that the overall cumulative significance of habitat destruction in this area by wind farms is moderate, and that the contribution by Impofu Wind Farms to this impact is low to moderate.
		Scenario 2 – Moderate negative significance The three authorised wind farms will transform an additional estimated 133.6 ha to Scenario 1. This brings the total habitat

Aspect	Description of impact	Significance of cumulative impacts
		transformation by wind farms in the area to 486.5 ha. In order to apply a cautious approach the specialist concludes that the cumulative significance of habitat destruction in this area, including the Impofu Wind Farms and planned wind farms, is moderate, and that the contribution by Impofu Wind Farms to this impact is moderate.
	Displacement of birds from the site	**Scenario 1 & 2 – Low negative significance** No displacement impacts have been recorded at the operational wind farms. The project specific impacts are of negligible negative significance. In addition to Scenario 1 it was found that the additional three proposed wind farms could individually result in potential displacement of certain species e.g. White-bellied Korhaan (only identified at Banna ba Pifhu), Denham's Bustard (Banna ba Pifhu and Ubuntu) and Blue Cranes (Oyster Bay). Overall it is concluded that the cumulative impact of displacement of birds by wind farms in the Kouga area for both scenarios is of low significance and the contribution to this by the Impofu Wind Farms is low.
	Disturbance of breeding during construction and/or operations.	**Scenario 1 & 2 – Low negative significance** Similarly, to above for displacement, it is concluded that the cumulative impact of displacement of birds by wind farms in the Kouga area is of low significance and the contribution to this by Impofu Wind Farms is low. The three authorised wind farms' avifaunal assessments did not discuss disturbance separately to displacement.
	Direct mortality of birds through collision with turbines.	**Scenario 1 – High negative significance** Operational fatalities of the four operational wind farms amount to 30.07 per year, and the Impofu Wind Farms would add an estimated 23.33 birds to bring the cumulative total fatalities of priority species to 53.40 birds per year. The three Impofu Wind Farms' fatalities amount to 43.69% of the total cumulative fatalities. Of these fatalities approximately half are Red Listed bird species (Denham's Bustards, Blue Cranes, Black Harriers and African Marsh-Harriers). Therefore, it was found that the cumulative turbine collision impact of wind farms on the priority bird species in the Kouga area is high. The contribution by the Impofu Wind Farms to the cumulative impact is high if all three wind farms are built but this is the worst-case scenario. Reasons being that this analysis does not take account of the avoidance measures already implemented at Impofu Wind Farms, which would reduce collision fatalities; and that experience across multiple operational wind farms has been that actual fatality rates are lower than those predicted during impact assessment.
		Scenario 2 – High negative significance In addition to Scenario 1, the three additional wind farms would add a further 9.66 fatalities per year to the 53.40 fatalities for Scenario 1 bringing it to 63.06 per year. The contribution of Impofu Wind Farms to the estimated cumulative impact of estimated priority bird fatalities is 36.99%. Based on these figures it was concluded that the cumulative turbine collision impact of wind farms on the priority bird species in the Kouga area is high. In addition to the factors considered by Scenario 1, it was also taken into account that turbine

Aspect	Description of impact	Significance of cumulative impacts
		models for the other three proposed wind farms could also be amended to incur greater impacts than originally assessed.
	Combined cumulative impact on birds	**Scenario 1 – Moderate negative significance**
		Scenario 2 – Moderate negative significance
Agriculture	Loss of agricultural land and associated agricultural potential	**Scenario 1 & 2 – Minor negative significance** The loss of these small proportions of productive land from the individual farms is insignificant in terms of the reduction in the agricultural output of those farms. If it is insignificant for each individual farm, then the cumulative impact on production for a number of wind farms is also insignificant, because the cumulative impact is the same proportion as the individual impact.
	Increased financial security for farming operations	**Scenario 1 & 2 – Moderate positive significance** Income earned by the individual farmers from the turbines on their land may benefit farming operations and increase investment into agricultural infrastructure, and thereby improve agricultural production levels. This benefit will be of moderate positive significance.
Socio-economic	Overall socio-economic impact	**Scenario 1 & 2 – Positive significance** The net effect of the proposed project from a socio-economic perspective during both the construction and operational phases would be positive. Under both Scenario 1 and Scenario 2 the same type of impacts will arise. This includes stimulation of local and national economy, skills development, job creation, increase in household earnings, improved quality of life, increase in government revenue, increase in production and GDP locally and nationally, provision of electricity, with some negative impacts being change in sense of place, impact on local tourism and associated livelihoods related to tourism, impact on property and land value, and impacts to social and economic infrastructure. Scenario 1 will be of greater significance than for the Impofu West Farm and Scenario 2 will be greater than Scenario 1. At this stage it cannot be quantified.
Palaeontology	Impact on fossil heritage (preserved in both the Palaeozoic bedrocks and the coastal aeolianites)	**Scenario 1 & 2 – Minor negative significance** Not all of the identified projects are of equal relevance for cumulative impact assessments since they do not all cover the same spectrum of potentially fossiliferous rock units and also cumulative palaeontological impacts are influenced by any substantial development in the region, and not just by wind farms. The only significant fossil sites recorded so far are (1) marine trace fossils in the Peninsula Formation near Rosenhof in the Impofu West Wind Farm site and (2) the Late Pleistocene hyaena den bone, tooth and coprolite assemblages within Nanaga Formation aeolianites in the Gibson Bay Wind Farm project area and near Oyster Bay. Therefore, the cumulative impacts of the three Impofu Wind Farm projects and proposed wind farms on fossil heritage – considered individually as well as a consolidated unit - are inferred to be minor as far as the Palaeozoic bedrocks are concerned. This would also apply to impacts on sparse but locally-rich fossil heritage preserved within the coastal aeolianites provided that adequate monitoring of major excavations here (e.g. wind turbine footings, roads,

Aspect	Description of impact	Significance of cumulative impacts
		substations and other buildings) is carried out during the construction phase.
Archaeology	Disturbance or destruction of Stone Age artefacts	**Scenario 1 & 2 – Major negative significance pre-mitigation reduced to minor negative post-mitigation** Excavations during construction may disturb or destroy Stone Age artefacts such as those found in the Impofu West Wind Farm (i*n situ* ESA and MSA artefacts in the surroundings of the quarry IW7). Overall the cumulative impact is considered to be negligible as archaeological monitoring is proposed to reduce any significant impacts. This could result in a positive impact as described below.
	Improved record of archaeological material	**Scenario 1 & 2 – Minor to moderate positive significance** The impact assessments required for these developments have greatly improved our record and understanding of archaeological material in the area and have provided an opportunity to conserve them for present and future generations. This is not possible if uncontrolled piecemeal developments as well as natural processes were to take place.
	Impacts to Pre-colonial Cultural Landscape (along the 5 km wide coastal strip)	**Scenario 1 & 2 - Major negative significance pre-mitigation reduced to minor negative post-mitigation** Although the proposed Impofu West Wind Farm will be situated in an existing and growing renewable energy landscape with numerous wind turbines in the immediate surroundings, the elimination of turbines from the archaeological No-Go area has helped to reduce this negative impact. Furthermore, the proposed archaeological monitoring in the pre-colonial cultural landscape during the construction phase will further assist in reducing potential negative impacts to heritage resources.
Noise	Operational noise impacts	**Scenario 1 & 2 – Not significant** For Scenario 2, only the proposed Oyster Bay Wind Farm was close enough to be considered additional. The modelling depicted that no additional sensitive receptors, besides those 13 identified within the Tsitsikamma Community Wind Farm are located within the 45 dB(A) noise contour. These receptors would experience further noise increases which are imperceptible as the increases are anticipated be less than 3 dB(A). This is similar for both scenarios. Therefore, noise levels are met and no cumulative effects anticipated.
Shadow flicker	Shadow flicker impacts	**Scenario 1 & 2 – Minor negative significance** For Scenario 2, only the proposed Oyster Bay Wind Farm was close enough to be considered as part of the cumulative assessment. The modelling depicted that all receptors that are expected to be impacted are located within the consolidated Impofu Wind Farm site. There are 87 receptors potentially impacted by the consolidated Impofu Wind Farm site, with an additional 48 for Scenario 1 and an additional 4 for Scenario 2. Even though the number of exceedances are high, with mitigation, the impact is considered minor negative significance.

Aspect	Description of impact	Significance of cumulative impacts
Visual	Visual impact	**Scenario 1 & 2 – Moderate negative significance for turbines and related infrastructure; moderate-minor negative for lighting and minor negative for decommissioning** Both scenarios would result in a change to the character of the area, particularly viewed from Oyster Bay and surrounding farmsteads. However, existing wind turbines are already visible from these areas. Where wind farms are grouped together, as in the case of the study area, viewsheds would tend to overlap to some degree, particularly as the proposed Impofu West Wind Farm can be seen as an infill wind farm in relation to the surrounding existing wind farms.

8.3 Cumulative impact statement

The impacts of the proposed project in combination with the other Impofu Wind Farm projects, and past, present and future wind farm proposals in the study area have been assessed for each specialist discipline, refer to Table 8.2. The cumulative impacts depend largely on whether the project specific mitigation that has been identified in Section 7 can be applied. Many of the impacts were rated as negligible or minor negative significance, however there were a few negative moderate impacts of concern, as well as some key mitigation measures discussed below.

The overall impact on avifauna is considered to be moderate negative significance (this includes destruction and alteration of habitat, displacement of birds from the site, disturbance of breeding and mortality from turbines) and a worst-case scenario has been taken into account which can be confirmed during operational monitoring. It is recommended that a cumulative approach to mitigation is pursued to achieve maximum effectiveness. In the Kouga area a unique situation exists where an entity already exists for the purpose of strategically managing such issues, the Greater Kromme Stewardship Initiative. It was therefore recommended that the Impofu Wind Farms should become a fully paid up member of this association during construction and operation for the purpose of further research and mitigation into the impacts of wind farms on priority bird species in the Kouga area.

Similarly, the moderate impact of terrestrial habitat loss and impact on broad-scale ecological processes was also rated moderate but mitigation includes the avoidance of specific habitats (dunes and wetlands) and minimisation of the development footprint areas, as well as contribution to the Greater Kromme Stewardship Initiative. This impact can therefore be reduced to a residual minor negative significance.

The only other moderate impact was that of the visual impact of the turbines. No mitigation exists as No-Go areas have already been avoided during screening and viewsheds would tend to overlap to some degree, particularly as the proposed Impofu West Wind Farm can be seen as an infill wind farm in relation to the surrounding existing wind farms.

Although cumulative aquatic impacts are rated as negligible negative significance, these can result in impacts of minor positive significance with proposed rehabilitation of wetlands. It was proposed by the specialist that mitigation includes the development and implementation of wetland and watercourse rehabilitation plan post environmental authorisation, i.e. once the final number of turbines and roads layouts has been finalised. This would reduce, and possibly improve the state of the affected aquatic environment at any of the proposed crossings, especially those shared with wind farms within the region.

Similarly, impacts to the Pre-colonial Cultural Landscape (the 5 km wide coastal strip) are rated as minor negative significance post-mitigation (since the development was removed from the undisturbed dune areas in the 5 km strip) but relies on archaeological monitoring of the coastal area identified as being sensitive by an qualified archaeologist during construction.

The impact on shadow flicker is rated as being of minor negative significance even with a worst-case scenario being applied in the assessment. It is therefore proposed that actual shadow flicker measurements are undertaken once the wind farm is operational to identify actual exceedances which should be less than anticipated and proposed suitable mitigation will be applied only where required.

The cumulative impact rating for bats could not be defined at present as it can only be properly assessed after the 12 month monitoring process is complete. Positive impacts include the financial security offered to farmers from the development of wind farms in the area and the additional income they are earning, which is rated as being of moderate significance. Socio-economic impact benefits include the stimulation of local and national economy, skills development, job creation, increase in household earnings, improved quality of life, increase in government revenue, increase in production and GDP locally and nationally and provision of electricity. Archaeological recording is considered to be a minor to moderate positive impact of the project as it provides an opportunity to record such material discovered in the area that might have been lost otherwise.

Other than the potential high impact of bird mortality from the turbines which is based on a worst-case scenario that can be confirmed during operational monitoring, there are no other major negative impacts which will exceed a critical threshold through the development of the project. All efforts to mitigate any residual project specific impacts should be pursued and contribution to the Greater Kromme Stewardship Initiative should be considered to contribute to local bioregional conservation efforts.

9 Conclusion

The proposed Impofu West Wind Farm project offers the potential to contribute to South Africa's national commitment to transition to a low carbon economy. As such a detailed Screening and Iterative Design Process has been undertaken for the project to date. This has resulted in the best practical environmental option possible for the Impofu West Wind Farm site, comprising 41 potential turbine locations.

The Impofu West Wind Farm is one of three proposed wind farms to be developed on a consolidated site near Oyster Bay in the Eastern Cape. It is located in an agricultural area that is transitioning to a renewable energy landscape due the presence of the existing and planned renewable energy projects in the broader area.

This Draft Scoping Report has been compiled to meet the requirements of NEMA[12], with the primary aim of informing I&APs of the proposed project and allowing them an opportunity to comment on the project before the Final Scoping Report is submitted to DEA. This report discusses the EIA process and the approach taken to the assessment of alternatives, including the motivation for the preferred alternative to be taken forward for consideration in the EIA phase. It also provides an overview of the baseline environment of the study area.

An array of environmental aspects were identified as having the potential to be impacted by the proposed development. The specialists listed in Table 2.3 have undertaken site visits (where required) and compiled the necessary assessments based on the conceptual layout dated 29 March 2018. The potential impacts expected to occur as a result of the proposed development, and any possible mitigation measures to reduce these impacts, are discussed in Section 7, and have been informed by the specialist findings. The cumulative impacts associated with the project have also been investigated and assessed in Section 8.

The Plan of Study for the EIA is presented in Section 10 below and outlines how the EIA is to be undertaken and prescribes the roles and responsibilities of parties involved. In addition to the assessments undertaken to date, if additional specialist studies are required as a result of comments on this report from I&APs, these studies will be undertaken during the EIA Phase and included in the EIR.

[12] Appendix 2 of amended EIA Regulations (GN R982) of NEMA lists the content required in a Scoping Report. This has been listed for cross checking purposes on the page preceding the table of contents.

10 Plan of Study for the EIA

This Plan of Study sets out how the EIA will be undertaken and must fulfil the requirements of Appendix 2 of GN R982, of the 2014 EIA Regulations, as amended. The sections below are in direct response to the list of requirements.

10.1 Introduction

The Scoping process for the proposed Impofu West Wind Farm has been documented in this report, which has identified various potential environmental impacts and project alternatives that require further detailed assessment in the EIA Phase. This Plan of Study for the EIA is the culmination of the Scoping Phase and its purpose is to ensure that the EIA Phase satisfies the requirements of NEMA. This Plan of Study for the EIA outlines the anticipated process and products for the EIA Phase.

10.2 Description of activity

The nature of the activity is described in detail in Section 6. Table 10.1 summarises the development components and their specifications.

Table 10.1: Summary of technical details for the proposed Impofu West Wind Farm

Component	Description / dimensions
Location of the site	The Impofu West Wind Farm site comprises of 9 farm portions cumulatively measuring ± 2,760 ha.
Site access	The site will be accessed from the District Road 1774 and MN50032. Existing roads will be utilised and upgraded as far as possible.
Export capacity	Maximum of 205 MW.
Proposed technology	Horizontal axis wind turbines.
Number of turbines	Maximum of 41 turbine locations.
Hub height from ground level	Maximum of 120 m[13], minimum of 90 m.
Rotor diameter	Maximum of 150 m[13].
Blade tip height	Maximum of 195 m[13], minimum of 30 m.
Area occupied by substation (including operation and maintenance buildings and areas)	Impofu West Substation approximately 150 x 75 m = 11,250 m^2
Area occupied by both permanent and construction laydown / site camp areas	Total approximately 269,500 m^2 comprising of: Temporary construction laydown areas (turbine hardstand areas): 41 x 100 x 50 m = 205,000 m^2; Temporary site camp areas: 3,000 m^2 ; and Permanent laydown areas of approximately 41 x 50 x 30 m = 61,500 m^2
Width and length of internal roads	Internal road network is ±31 km in length, here existing roads and tracks will be used as far as practicable. Areas that require permanent access for maintenance will be approximately 6 m in width and it is anticipated that some sections of the road would need to be temporarily widened to 12 m during construction.
Length of overhead lines	Approximately 770 m of internal overhead lines (three locations).
Type and height of fencing	Any existing fences that are disturbed will be repaired or replaced with something similar to the original.

[13] Note that this is considered to represent an exacerbated rotor swept area envelope and would likely to be of lesser dimensions.

Component	Description / dimensions
	Temporary fencing may be erected around the construction site offices and laydown areas, for security, health and safety reasons. Permanent security fencing will be installed around the substation area to prevent unauthorised access. Fencing may be up to ±3 m in height.

10.3 Description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity

Section 5 (Alternatives rationale) reviewed the possible project alternatives associated with the proposed activities. Based on this process, alternatives other than the No-Go alternative have been screened out of the EIA Phase

Table 10.2: Alternatives for the Proposed Impofu West Wind Farm Project

Alternative type	Alternative description
Location	The proposed project is located in an area of excellent wind conditions for wind energy generation and the Proponent has developed two other wind farms in the area. However, the Proponent also considered several potential alternative sites in the process, those in the Eastern Cape Province were discarded due to the presence of Cape Vulture roosts and those in the Western Cape and Northern Cape were discarded due to issues with the Square Kilometre Array (SKA) telescope and lack of grid connection possibilities. Therefore, location alternatives have been screened out of the EIA Phase.
Design and layout	A detailed Screening and Iterative Design Process which involved a multi-disciplinary team has served to identify all sensitive 'No-Go' areas specific to each environmental aspect for the various infrastructure components (turbines, internal overhead lines, roads and cables and buildings). These areas have subsequently been avoided in application of the mitigation hierarchy. This process was based on extensive field work and micro-siting and is considered to be adequately robust to ensure that all significant environmental impacts are avoided from the outset of the design process. Therefore, layout alternatives have been screened out of the EIA Phase.
Technology	Only horizontal axis wind turbines have been considered in this assessment as vertical axis turbines are not yet viable for large scale commercial purposes in South Africa. To allow for the fact that technology could evolve by the time of construction, a worst-case scenario of turbine specifications has been adopted to allow for a range of specifications that could inflict the highest possible potential impacts. Therefore, technology alternatives have been screened out of the EIA Phase.
No-Go	The EIA will assess the project against the No-Go alternative. This will assume that the proposed Impofu West Wind Farm will not be constructed and the *status quo* of the current farming activities will continue.

10.3.1 Description of the aspects to be assessed as part of the EIA process

Section 7 includes a summary of the baseline environment and the potential impacts to this environment that are likely to occur as a result of the project. Of all of the specialist studies, only the palaeontological study has been screened out of the EIA Phase. The palaeontology specialist has found that pending the potential discovery of significant new fossil remains, all other potential impacts can be mitigated by following the Chance Fossil Finds Procedure, warranting that no further studies are required for the EIA Phase.

Therefore, the following specialist studies will be updated during the EIR Phase:

- Terrestrial ecology
- Aquatic ecology
- Bats
- Avifauna
- Agriculture
- Socio-economic
- Archaeology
- Noise and shadow flicker
- Visual

Level of detail of the specialist studies during Scoping versus EIA

During the Pre-Application Scoping Phase, specialists were requested to assess the impacts of the proposed site layout to meet the requirements of Appendix 6 (Contents of Specialist Reports) of GN R982 of 2014, as amended (detailed specialist studies have been included in Appendix C). This Scoping Report has been prepared to meet the requirements of Appendix 2 (Contents of Scoping Report) of GN R982 of 2014, as amended, therefore, much of the detail of the Specialist Reports has not been included in this Scoping Report.

By adopting this precautionary approach, it ensures that more accurate, detailed and robust information is available to all stakeholders (Proponent, engineers, specialists, authorities, I&AP's etc.) early on in the process therefore allowing stakeholders more time to engage during the EIA process in a more informed manner. By following this approach it is anticipated that once the project is subject to the detailed and legislated timeframe of the EIA process, potential significant impacts have already been identified and avoided (where possible) which reduces the likelihood of significant issues being dealt with during the legislated EIA process. This precautionary approach leads to a more robust assessment for the DEA to make an informed decision.

This Plan of Study therefore details the methodology that the specialists have already undertaken as well as any additional input which will form the basis of the EIA Phase.

10.3.2 Aspects to be assessed by specialists

The specialists listed in Table 10.3 below have been appointed to:

1. Undertake a review of all new information emanating from the Scoping Phase of the project, this includes project information, design iterations and information or comments from I&APs.
2. A focused and relevant description of all baseline characteristics and conditions of the receiving environment (e.g.: site and/or surrounding land uses including agricultural areas as applicable) in relation to the Specialist's field of interest, based on all relevant available data, reports and maps, and information obtained from any field work investigations undertaken to date.
3. Where relevant, undertake additional field work / research / monitoring activities / consultation for issues or sensitive elements of the receiving environment within the specialist's field of interest (if such studies were identified as necessary during the Scoping Phase) to identify and evaluate possible impacts.
4. A detailed evaluation of the predicted impacts of the proposal and any of its selected alternatives on the receiving environment, or of the receiving environment on the proposal and any of its selected alternatives (namely the No-Go alternative) as per the methodology prescribed in Section 10.3.4). The impact assessment is to include for:

- An assessment of impacts for all phases of the life-cycle of the project, namely construction, operation, and decommissioning phases, as well as the direct and indirect impacts;
- An assessment of the probability of each impact occurring, the reversibility of each impact and the level of confidence in each potential impact;
- An assessment of the significance of each impact before and after mitigation;
- The identification of any residual risks that will remain after implementation of design and planning mitigation; and
- An assessment of the No-Go alternative.

5. Provide a detailed description of appropriate mitigation measures that can be adopted to reduce or avoid negative impacts and improve positive impacts for each phase of the project, where required, and the significance of impacts pre- and post-mitigation.
6. Consider and evaluate the cumulative impacts in terms of the current and proposed activities in the area.
7. Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
8. Consult with the commenting authorities where relevant to their disciplines.
9. Provide a summary of succinct and practical recommendations based on mitigation measures identified to form the basis of environmental authorisation requirements, should the development be authorised.
10. Comply with the content requirements for specialist reports listed in Appendix 6 of the 2014 EIA Regulations (GN R982 of 2014, as amended).
11. Prepare a Specialist EIA Phase Report to inform and contribute towards the EIA Phase of the environmental application in terms of NEMA.

Table 10.3: Appointed specialists

Specialist field	Consultant	Company
Terrestrial ecology	Simon Todd	3Foxes Biodiversity Solutions (Pty) Ltd
Aquatic ecology	Dr Brian Colloty	Scherman, Colloty and Associates
Bats	Werner Marais	Animalia consultants
Avifauna	Jon Smallie	Wildskies ecological services
Agriculture	Johann Lanz	Independent consultant
Socio-economic	Matthew Keeley and Thomas Parsons	Urban-Econ Development Economists
Archaeology	Dr Peter Nilssen	Independent consultant
Noise and shadow flicker	Astrid Peeters and Lien Van Breusegem	3E
Visual	Quinton Lawson and Bernard Oberholzer	Quinton Lawson, Architect and Bernard Oberholzer, Landscape Architect

10.3.3 Description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists

A standard method of assessing social and environmental impacts has been detailed Section 10.3.4 below. The aspects for assessment that were identified in the Scoping Phase are listed below in Table 10.4.

These aspects will be assessed together with the cumulative effects of other wind farm developments in the area. Cumulative effects are commonly understood to be impacts from different projects that combine to result in significant change, which could be larger than the sum of all the individual impacts. Two scenarios will be assessed, Scenario 1 includes the assessment of impacts from Impofu West Wind Farm on the baseline, in combination with the impacts of Impofu North and Impofu East Wind Farms. Scenario 2 includes the assessment of cumulative impacts from all three Impofu Wind Farms and associated infrastructure on the baseline in addition

to the proposed Oyster Bay, Banna Ba Pifhu and Ubuntu Wind Farms which are within a 30 km radius from the consolidated site and have valid environmental authorisations.

Table 10.4: Identified environmental aspects per project phase

Environmental aspect	Project Phase		
	Construction	Operation	Decommissioning
Terrestrial ecology	x	x	x
Aquatic ecology	x	x	
Bats	x	x	
Avifauna	x	x	
Agriculture	x	x	x
Socio-economic	x	x	x
Archaeology	x		
Noise and shadow flicker	x	x	x
Visual	x	x	x

10.3.4 Description of the proposed method of assessing duration and significance

This section outlines the proposed method for assessing the significance of the potential environmental impacts. For each predicted impact, criteria are ascribed and these include the intensity (size or degree scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale); and the extent (spatial scale), as well as the probability (likelihood). The methodology is quantitative, whereby professional judgement is used to identify a rating for each criteria based on a seven-point scale (refer to Table 10.5); and the significance is auto-generated using a spreadsheet through application of the calculations in Figure 10.1. Specialists have the opportunity to comment where they disagree with the auto-calculated impact significance rating.

Calculations

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **intensity** *(*size or degree scale), which also includes the **type** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

Consequence = type x (intensity + duration + extent)

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

Significance = consequence x probability

Depending on the numerical result, the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

Figure 10.1: Calculation of significance

Table 10.5: Assessment criteria for the evaluation of impacts

Criteria	Numerical Rating	Category	Description
Duration	1	Immediate	Impact will self-remedy immediately
	2	Brief	Impact will not last longer than 1 year
	3	Short term	Impact will last between 1 and 5 years
	4	Medium term	Impact will last between 5 and 10 years
	5	Long term	Impact will last between 10 and 15 years
	6	On-going	Impact will last between 15 and 20 years
	7	Permanent	Impact may be permanent, or in excess of 20 years
Extent	1	Very limited	Limited to specific isolated parts of the site
	2	Limited	Limited to the site and its immediate surroundings
	3	Local	Extending across the site and to nearby settlements
	4	Municipal area	Impacts felt at a municipal level
	5	Regional	Impacts felt at a regional level
	6	National	Impacts felt at a national level
	7	International	Impacts felt at an international level
Intensity	1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
	2	Very low	Natural and/ or social functions and/ or processes are slightly altered
	3	Low	Natural and/ or social functions and/ or processes are somewhat altered
	4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
	5	High	Natural and/ or social functions and/ or processes are notably altered
	6	Very high	Natural and/ or social functions and/ or processes are majorly altered
	7	Extremely high	Natural and/ or social functions and/ or processes are severely altered
Probability	1	Highly unlikely / None	Expected never to happen
	2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
	3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
	4	Probable	Has occurred here or elsewhere and could therefore occur
	5	Likely	The impact may occur
	6	Almost certain / Highly probable	It is most likely that the impact will occur
	7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

When assessing impacts, broader considerations are also taken into account. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in Table 10.6, Table 10.7 and Table 10.8, respectively.

Table 10.6: Definition of confidence ratings

Category	Description
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table 10.7: Definition of reversibility ratings

Category	Description
Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 10.8: Definition of irreplaceability ratings

Category	Description
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

10.3.5 The stages at which the competent authority will be consulted

Table 10.9 below sets out the key stages of consultation with the competent authority.

Table 10.9: Consultation with DEA

Consultation phase	Description
Pre-Application meeting	A Pre-Application meeting was held with DEA on 17 October 2017 to inform DEA of the proposed project and approach to the EIA process. Also, to request input on the specialist studies to be conducted and other procedural matters. A second Pre-Application meeting was held with the DEA on 11 September 2018, prior to submission of the Application Form and this Draft Scoping Report.
Comment on Pre-Application Scoping Report	The DEA was notified of the release of the Pre-Application Scoping Report for public comment from 1 August to 7 September 2018.
Comment on Draft Scoping Report	The DEA will be requested to provide comments on the Draft Scoping Report when the report is made available for public comment, from 11 October to 9 November 2018. This is to ensure that the Final Scoping Report contains sufficient information for DEA to make an informed decision and to ensure the report satisfies the content requirements listed in the 2014 EIA Regulations, as amended. In terms of Regulation 7(5) of GN R982 of 2014, as amended, DEA is required to submit comments within 30 days of the request for comment. Once the 30-day public participation process of the Draft Scoping Report has been completed, the Public Participation Report (Appendix B of the Scoping Report) will be updated with comments and responses. The Scoping Report will be finalised, incorporating any changes where necessary. All comments received and responses given to interested and affected parties have been included in Appendix B.
Comment and decision on Final Scoping Report	In terms of Regulation 22 of GN R982, the competent authority must, within 43 days of receipt of the Final Scoping Report, consider it, and in writing –

Consultation phase	Description
	(a) Accept the report and advise the environmental assessment practitioner (EAP) to proceed with the tasks contemplated in the Plan of Study for EIA; (b) Refuse the environmental authorisation if; (i) The proposed activity is in conflict with a prohibition contained in legislation; or (ii) If the Scoping Report does not substantially comply with the objectives and content requirements for scoping reports in terms of the 2014 EIA Regulations, as amended, and the applicant cannot ensure compliance with these regulations within the prescribed timeframe.
Comment on Draft EIR	Should the Final Scoping Report and Plan of Study for the EIA be accepted, the Draft EIR will be compiled. DEA will be requested to provide comments on the Draft EIR when it is made available for public comment. This is to ensure that the Final EIR contains sufficient information for DEA to make an informed decision and to ensure these reports satisfy the content requirements listed in the 2014 EIA Regulations, as amended. DEA will be required, in terms of Regulation 7(5) of GN R982 of 2014 to submit comments within 30 days of the request for comment.
Comment and decision on Final EIR	In terms of Regulation 24 of GN R982, DEA must within 107 days of receipt of the EIR and Environmental Management Programme (EMPr), in writing- (a) Grant environmental authorisation in respect of all or part of the activity applied for; or (b) Refuse environmental authorisation.

10.3.6 Particulars of the public participation process that will be conducted during the EIA process

A detailed Public Participation Report has been attached to the Scoping Report as Appendix B. This report will be updated at each of the project phases. The report will include an updated list of the stakeholder database, tools of communication for public participation (e.g. advertisements, letters, etc.) as well as the proof of delivery thereof.

Public consultation activities are summarised in Table 10.10 below with the key dates set out in Table 4.1 (in Section 4.6) which will be updated as the EIA process progresses.

Table 10.10: Particulars of the PPP to be conducted during the EIA process

Task	Screening	Pre-App	Draft SR	Draft EIR
Background Information Document A BID was compiled to notify potential stakeholders of the project, set out the EIA process and let stakeholders know how they can participate. It was written in simple English, Afrikaans and isiXhosa and was distributed to identified stakeholders.	x			
Summary Pamphlet A single page non-technical Summary Pamphlet was written in simple English, Afrikaans and isiXhosa and was distributed to landowners to distribute to any occupiers residing on their property during the Screening and Iterative Design Phase.	x			
Written Notification	x	x	x	x

Task	Screening	Pre-App	Draft SR	Draft EIR
Letters and/or emails were issued to all landowners, adjacent landowners and key stakeholders informing them of the proposed project and opportunity to comment at the respective phases on the respective reports. Included in this correspondence is either a BID or a Non-Technical Summary (NTS) of the respective report.				
Site notices Site notices in English, Afrikaans and IsiXhosa were erected on site; and at a number of other community facilities.	x	x		
Newspaper advertisements Advertisements in English, Afrikaans and IsiXhosa were placed in a provincial newspaper the *Eastern Cape Herald* and local newspaper *Kouga Express*, notifying the broader public of the process and inviting them to register.	x	x		x
Document availability The reports are accessible from the Aurecon website and on Dropbox, and to view in hard copy at the Kouga Municipality in St Francis Bay, the Oyster Inn, the Humansdorp public library, and the Thornhill Hotel. Key authorities will be provided with a hard copy or CD as per their particular requirements.	x	x	x	x
Meetings A **Pre-Application meeting** was undertaken with DEA on 17 October 2017. A Second **Pre-Application meeting** was held with DEA on 11 September 2018. **Focus group meetings** were held with authorities, landowners and key stakeholders with regards to the proposed project. **Public meetings** were held during the Pre-Application Phase (in form of open days)and further public meetings will be held at the Draft EIR Phase. The public open day will also serve the Impofu East and Impofu North Wind Farms as well as the proposed associated Grid Connection. The public meeting will be advertised to the general public in the area through advertisements, and all registered I&APs will be invited in writing. Further **meetings with relevant authorities** will be held as and when necessary.	x x	x x		x

10.3.7 Description of the tasks that will be undertaken as part of the EIR

The following tasks are proposed to be undertaken during the EIR Phase:

1. The site layout will be finalised through a 'design freeze' and informed by information that has arisen during the PPP.
2. Additional specialist work will be undertaken as set out in Table 10.11. This work will be used to inform and refine the impact assessment significance ratings, mitigation measures or recommendations and the cumulative impact assessments where relevant.

Table 10.11: Description of the tasks that will be undertaken as part of the EIR

Aspect	Description of tasks
Aquatic	The aquatic ecology report will be updated to provide the details of the final delineation of any aquatic environments (if required). Tasks could include: • Updating and finalising PES, and Ecological Importance and Sensitivity scores for respective aquatic systems; and • Any updates to the impact assessment ratings and associated mitigation measures, if required. These updates will be based on the final pre-construction site walkdown conducted in March 2018.
Bats	To date there has been 3 months of pre-construction bat monitoring. Further work entails the completion of the full and final 12 months of pre-construction monitoring.
Avifauna	No further discipline specific tasks as 12 months of pre-construction monitoring is complete.
Agriculture	The specialist will complete the case study named '*The impact of wind farms on agricultural resources and production - a case study from the Humansdorp area, Eastern Cape*' which measures production data of 15 dairy farms. This case study will be completed and will inform the assessment.
Socio-economic	The specialist will conduct interviews with I&APs (i.e. effected and adjacent landowners; municipal LED officers; local tourism organisation representatives etc.). These interviews will assist with validating and quantifying preliminary information and impacts (e.g. GDP, production, employment, individual income, and the livelihoods of farmers and farm workers).
Palaeontology	Scoped out of the EIA.
Archaeology	No further discipline specific tasks required.
Noise and shadow flicker	Remodelling required by the specialist only if a change in turbine layout occurs.
Visual	No further discipline specific tasks required.

3. Specialist reports will be completed in accordance with Section 10.3.2 .
4. Where required, consultation will be undertaken with DAFF, DWS, Greater Kromme Stewardship Initiative, Gamtkwa Khoisan Council, Eskom, SANRAL and Eastern Cape Department of Roads and Public Works as key authorities / organisations relevant to the project.
5. The EIR will be drafted in accordance with Appendix 3 of the 2014 EIA Regulations (GN R982 of 2014, as amended).
6. The Draft EIR will be circulated for a 30-day public comment period.
7. The EIR will be finalised based on input received during the public comment period, and responses will be circulated to all registered I&APs.

8. The EIR, inclusive of the updated public participation report, will be submitted to the competent authority (DEA) for decision making.
9. Following the 107-day period of decision making, the registered I&APs will be notified whether an environmental authorisation has been granted or refused for the project.

10.3.8 Identification of suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

The preliminary mitigation measures, listed in Table 7.11 have been identified during the Scoping Phase. These will be expanded upon where necessary following further investigation during the EIA phase and will be used to inform the EMPr which will accompany the EIR.

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Reg No 1977/003711/07
Aurecon Centre
1 Century City Drive
Waterford Precinct
Century City
Cape Town 7441
PO Box 494
Cape Town 8000
South Africa

T +27 21 526 9400
F +27 21 526 9500
E capetown@aurecongroup.com
W aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Botswana, China,
Ghana, Hong Kong, Indonesia, Kenya,
Lesotho, Macau, Mozambique,
Namibia, New Zealand, Nigeria,
Philippines, Qatar, Singapore, South Africa,
Swaziland, Tanzania, Thailand, Uganda,
United Arab Emirates, Vietnam.