

ESKOM HOLDINGS SOC LIMITED

**PROPOSED CONSTRUCTION OF TWO
POLLUTION CONTROL DAMS AT MATIMBA
POWER STATION'S ASH DISPOSAL
FACILITY, DFFE REF: 14/12/16/3/3/1/2493
FINAL BASIC ASSESSMENT REPORT**

04 MAY 2022

DRAFT





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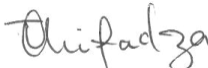


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This Final Basic Assessment Report (Report) for the Proposed Construction of Two Pollution Control Dams at Matimba Power Station's Ash Disposal Facility was prepared by WSP Group Africa (Pty) Ltd (WSP) on behalf and at the request of Eskom Holdings SOC Ltd (Client), as part of the application process for Environmental Authorisation.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

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GLOSSARY

ABBREVIATION	MEANING
AIA	Archaeological Impact Assessment
BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CBA	Critical Biodiversity Area
CR	Critically Endangered
CRR	Comment and Response Report
DDFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EN	Endangered
GA	General Authorisation
I&AP	Interested and Affected Party
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resource Act
NWA	National Water Act

ABBREVIATION**MEANING**

PPE	Personal Protective Equipment
SAHRA	South African Heritage Resources Agency
SCC	Species of Conservation Concern
VU	Vulnerable
WMA	Water Management Area
WSP	WSP Group Africa (Pty) Ltd
WUL	Water Use License

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F-3 2022 Heritage Impact Assessment Exemption Letter & 2014 Impact Assessment

G EMPR

1 INTRODUCTION

1.1 BACKGROUND AND TERMS OF REFERENCE

Eskom Holdings SOC Ltd (Eskom) proposes to construct two pollution control dams (PCDs) and a diversion trench at the Matimba Power Station Ash Disposal Facility (ADF). The proposed PCDs and diversion trench will be on Portion 0 of Farm Zwartwater, 507/LQ in Lephallale, Ward 2, Lephallale Local Municipality, Waterberg District Municipality, Limpopo Province.

Matimba Power Station applied for, and obtained, an Integrated Environmental Authorisation (IEA) in terms of the National Environmental Management: Waste Act (NEMWA), Act 59 of 2008 and the Environmental Impact Assessment (EIA) Regulations (2010) promulgated under the National Environmental Management Act (NEMA) No. 107 of 1998, (as amended) for the continuation of its ash disposal facility. The IEA with DEFF Ref no.: 14/12/16/3//3/56 was issued on 14 July 2016. A Water Use Licence (WUL) was also obtained in September 2017 for the associated water uses as per Section 40 of the National Water Act (No. 36 of 1998). Works commenced with the Piggybacking operations in November 2020.

The proposed PCDs and diversion trench require an environmental authorisation (EA) in terms of the NEMA and the associated EIA Regulations, 2014 as amended. WSP Group Africa (Pty) Ltd (WSP) was appointed by Eskom as the independent Environmental Assessment Practitioner (EAP) to facilitate the Basic Assessment (BA) process in accordance with the EIA Regulations, 2014, as amended.

Following a revision of the site water balance during detailed design, it was noted that an additional two PCDs and a diversion trench are required to contain surface runoff from the authorised ADF footprint.

Figure 1-1 below shows a locality map of the ADF and the Matimba Power Station.

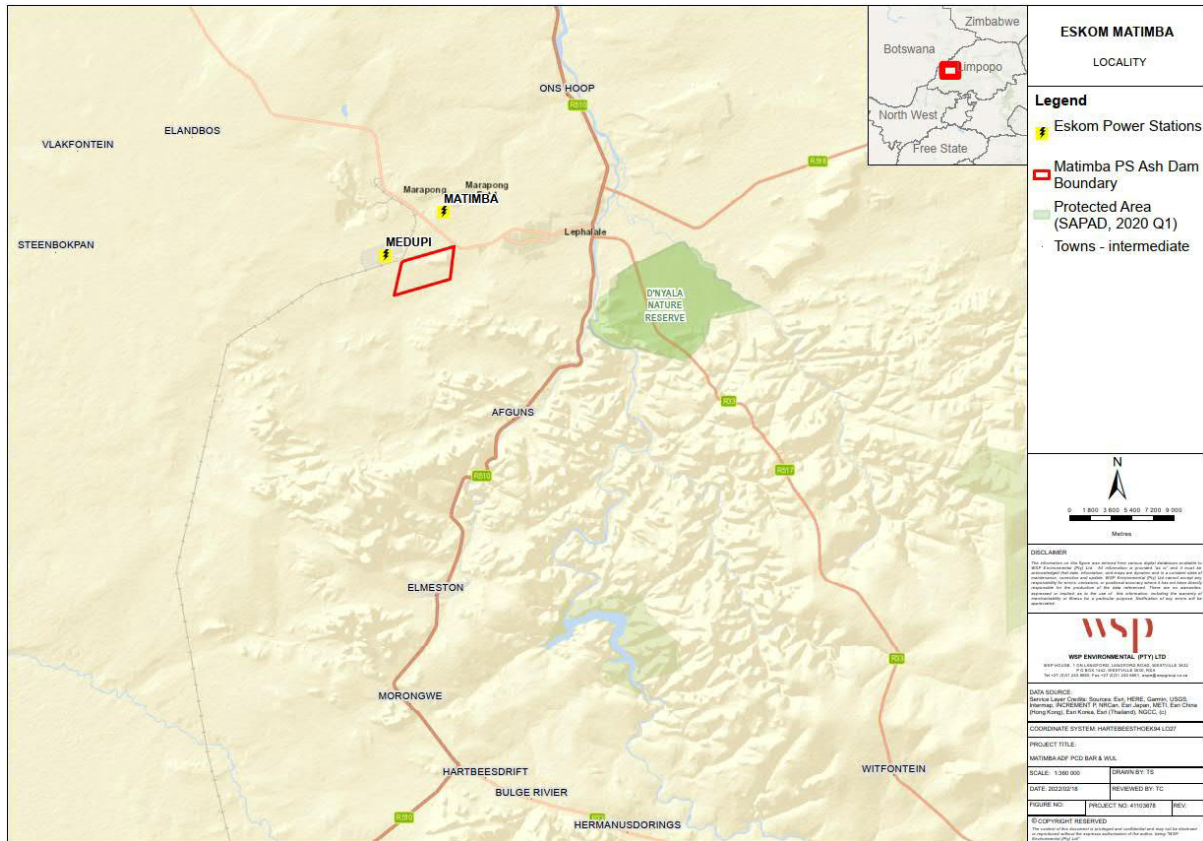


Figure 1-1: Matimba Power Station Ash Disposal Facility Locality Map

1.2 PURPOSE OF THE BA PROCESS

The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process aims to identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of potential negative and positive consequences of the proposed construction of the PCDs and diversion trench. This provides the competent authority (CA) sufficient information to make an informed decision with regards to granting or refusing the EA applied for.

1.3 DETAILS OF EAP AND PROJECT PROPONENT

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed construction of the PCDs and the diversion trench. The CV of the EAP is available in **Appendix A-1**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 1-1** details the relevant contact details of the EAP. In order to adequately identify and assess potential environmental impacts, the EAP was supported by a number of specialists.

Table 1-1: Details of the EAP

EAP	WSP GROUP AFRICA (PTY) LTD
Company Registration:	1995/08790/07
Contact Person:	Ashlea Strong
Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address:	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone:	011 361 1392
Fax:	011 361 1301
Email:	Ashlea.Strong@wsp.com

Table 1-2 provides the relevant details of the project proponent.

Table 1-2: Details of Proponent

PROPONENT:	ESKOM HOLDINGS SOC LTD (MATIMBA POWER STATION)
Company Registration:	2002/015527/30
Contact Person:	Deidre Herbst (Generation Environmental Manager)
Physical Address:	Megawatt Park, 1 Maxwell Drive, Sunninghill, Sandton
Postal Address:	P.O. Box 1091, Johannesburg, 2001
Telephone:	011 800 3501
Email:	Deidre.Herst@eskom.co.za

1.4 SPECIALISTS

Specialist input was required in support of this application for EA. The details of the specialists are provided in **Table 1-3** below. The Curriculum Vitae of the specialists are attached in **Appendix A** and their declarations in **Appendix B**.

Table 1-3: Details of Specialists

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT	SPECIALIST IN REPORT ATTACHED AS
Biodiversity Assessment	Lufuno Nemakhavhani & Andrew Zinn	Golder	Section 5.6	Appendix F-1
Surface Water Assessment	Lee Boyd	Golder	Section 5.3	Appendix F-2
Heritage Assessment	Prof Anton van Vollenhoven	Archaetnos Culture & Cultural Resource Consultants	Section 5.7	Appendix F-3

1.5 COMPETENT AND COMMENTING AUTHORITIES

Table 1-4 provides the relevant details of the competent and commenting authorities on the project.

Table 1-4: Competent and Commenting Authorities

ASPECT	COMPETENT / COMMENTING AUTHORITY	CONTACT DETAILS
Competent Authority: Environmental Authorisation	Department of Forestry, Fisheries and the Environment (DFFE)	Integrated Environmental Authorisations Tel: 012 399 9388 Lunga Dlova (Case Officer) LDlova@dfpe.gov.za
Commenting Authorities	Department of Environmental Affairs: Biodiversity Conservation Unit	Biodiversity Conservation Unit Tel: 012 399 9411 Portia Makitla Pmakitla@environment.gov.za
	South African Heritage Resource Agency (SAHRA)	Uploaded to SAHRA Website during public review period.
	Limpopo Heritage Resources Authority (LIHRA)	Mr Donald Lithole 21 Biccard Street, Polokwane, 0699

ASPECT	COMPETENT / COMMENTING AUTHORITY	CONTACT DETAILS
	Limpopo Department of Economic Development, Environment and Tourism (LEDET)	Tel: 015 293 8830 Ms B Nemavhandu NemavhanduB@ledet.gov.za
	Limpopo Department of Agriculture and Rural Development (LDARD)	Tel: 013 235 2395 Mr Selemela Selemelam@agric.limpopo.gov.za
	Waterberg District Municipality	Tel: 014 762 1409 / 014 762 1412 M.P. Sebatjane: Planning and Economic Development
	Lephalale Local Municipality	Tel: 014 762 1409 Maria Cocquyt (Municipal Manager) / Victor Monyepao (Public Participation) mariacocquyt720@gmail.com / Victor.Monyepao@lephalale.gov.za
Water Use	Department of Water and Sanitation (DWS)	Water Use Licence Applications Tel: 012 318 0516 Case Officer to be confirmed

1.6 BASIC ASSESSMENT REPORT STRUCTURE

The Final BAR (this report) was prepared to meet the requirements as described in Appendix 1 of GNR 326 of the NEMA EIA Regulations, 2014, as amended. To demonstrate legal compliance, **Table 1-5** cross-references the sections within the BA report with the requirements of Appendix 1 of GNR 326.

Table 1-5: Legal Requirements as detailed in Appendix 1 of GNR 326 of the 2014 EIA Regulations, as amended

APPENDIX 1 OF GNR 326	DESCRIPTION	RELEVANT REPORT SECTION
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section 1.3 Appendix A
3(1) (b)	The location of the activity	Section 4.1
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale	Section 4.2
3(1) (d)	A description of the scope of the proposed activity	Section 4
3(1) (e)	A description of the policy and legislative context within which the development is proposed	Section 2

**APPENDIX 1 OF
GNR 326**

DESCRIPTION

**RELEVANT
REPORT SECTION**

3(1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 4.3
3(1) (g)	A motivation for the preferred site, activity and technology alternative	Section 5
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site	Section 5
3(1) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity	Section 3.5
3(1) (j)	An assessment of each identified potentially significant impact and risk	Section 7
3(1) (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 8
3(1) (l)	An environmental impact statement	Section 8.4
3(1) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	Appendix G
3(1) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Not applicable
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 3.7
3(1) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 9
3(1) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post construction monitoring requirements finalised	Not applicable
3(1) (r)	An undertaking under oath or affirmation by the EAP	Appendix B
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	Not applicable

**APPENDIX 1 OF
GNR 326**

DESCRIPTION

**RELEVANT
REPORT SECTION**

3(1) (t)	Any specific information that may be required by the competent authority	Not applicable
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	Not applicable

2 GOVERNANCE FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 2-1** below.

Table 2-1: Applicable Legislation and Policies

APPLICABLE LEGISLATION POLICY	AND	DESCRIPTION OF LEGISLATION
-------------------------------------	-----	----------------------------

The Constitution of South Africa (No. 108 of 1996)		The Constitution cannot manage environmental resources as a stand-alone piece of legislation, hence additional legislation was promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act (No. 107 of 1998)		<p>In terms of Section 24(2) of the NEMA, the Minister may identify activities which may not commence without prior authorisation. The Minister thus published GNR 327 (Listing Notice 1), 325 (Listing Notice 2) and 324 (Listing Notice 3) listing activities that may not commence prior to authorisation (7 April 2017).</p> <p>The regulations outlining the procedures required for authorisation are published in GNR 326 [Environmental Impact Assessment Regulations (EIA)] (2014, as amended). Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity.</p> <p>WSP undertook a review of the listed activities according to the proposed project description to conclude that Listed Activities 9 and 27 of GNR 327 (Listing Notice 1) and Listed Activity 12 of GNR 324 (Listing Notice 3) are considered applicable and therefore a BA process must be followed. An EA is required and is being applied for.</p>
<i>Listing Notice 1: GNR 327</i>		<p>Activity 9 – <i>The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—</i></p> <p><i>(i) with an internal diameter of 0,36 metres or more; or</i></p> <p><i>(ii) with a peak throughput of 120 litres per second or more;</i></p> <p>Description:</p> <p>The pipelines leading to the PCD will exceed 1 000 metres. Piping from North PCD to existing Ash Dam 1 will be 2 300m in length and piping from South PCD to existing Metsimaholo Dam will be 300m in length. The current design proposes for 140, 160 and 180 HDPE and 300NB steel pipelines, which are below the 0.36m threshold internal diameter, with a throughput less than the 120L/s (60L/s) threshold. However, this trigger will be assessed owing to potential changes in the design.</p>
<i>Listing Notice 1: GNR 327</i>		<p>Activity 27 – <i>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.</i></p> <p>Description:</p>

**APPLICABLE
LEGISLATION
POLICY**

AND

DESCRIPTION OF LEGISLATION

	<p>The South PCD and North PCD have a footprint of 5.94ha and 4.35ha respectively that will be cleared. Each PCD footprint is inclusive of each PCD's support infrastructure (dam, silt trap and access road area). The total footprint to be cleared is 10.29ha. Therefore, the establishment of the two PCDs will require the clearance of less than 20 hectares of indigenous vegetation.</p>
<p><i>Listing Notice 3: GNR 324</i></p>	<p><i>Activity 12 – The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><i>e. Limpopo</i></p> <p><i>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</i></p> <p>Description:</p> <p>The total footprint to be cleared is 10.29ha. The project footprint is within an Ecological Support Area (ESA). Therefore, there is potential for the clearance of more than 300 square metres of indigenous vegetation within the ESA.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<p>The objectives of this Act are within the framework of the National Environmental Management Act, include:</p> <ul style="list-style-type: none"> – The management and conservation of biological diversity within the Republic of South Africa and the components of such biological diversity – The use of indigenous biological resources in a sustainable manner; and – The fair and equitable sharing among stakeholders of benefits arising from bio prospecting involving indigenous biological resources; and – Giving effect to ratified international agreements relating to biodiversity which are binding on the Republic. <p>The Act, amongst others, provides the framework for biodiversity management and planning, comprising a national biodiversity framework, bioregions and bioregional plans, and biodiversity management plans and agreements.</p> <p>Threatened and protected ecosystems (Section 52) have been listed (December 2011) and activities or processes within those ecosystems may be listed as 'threatening processes', thus triggering the need to comply with the NEMA EIA regulations. List of critically endangered, endangered, vulnerable and protected species have also been promulgated in terms of this Act (2007), covering species affected by 'restricted' activities; effectively those species hunted, bred or traded for economic gain. In addition, regulations addressing alien and invasive species and their management/control were promulgated in 2014.</p> <p>The proposed project area falls within an ESA. The specialist indicated that the area proposed for the South PCD has been degraded due to previous transformations due to construction of support infrastructure for the ADF.</p>
<p>National Water Act, 1998 (Act No. 36 of 1998)</p>	<p>The National Water Act, 1998 (Act No. 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment.</p> <p>The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water which the Minister may declare a watercourse.</p> <p>The proposed North PCD footprint is within 100m of a waterbody. As such, the proposed development triggers Section 21 (c) and (i) water use activities as per the NWA as it is within 500m regulated area of a defined watercourse. Furthermore, both the North and South PCDs</p>

**APPLICABLE
LEGISLATION
POLICY**

AND

DESCRIPTION OF LEGISLATION

	<p>which will store stormwater from the surface of the ADF will trigger Section 21 (g) and Section (h) water use activities.</p> <p>A WUL is being applied for as part of the process.</p>
<p><i>National Heritage Resources Act (Act No. 25 of 1999)</i></p>	<p>The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the SAHRA, and lists activities which require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.</p> <p>In terms of the Section 38 of the NHRA, any person who intends to undertake a linear development exceeding 300m in length or a development that exceeds 5000m² must notify the heritage resources authority and undertake the necessary assessment requested by that authority.</p> <p>In the case of the proposed PCDs and diversion trench, the project triggers the 5000m² threshold. A Heritage Impact Assessment (HIA) was conducted on the proposed project footprint in 2014 and now, a desktop assessment will be conducted to verify the initial findings. The 'Chance find Procedure' should be followed as required if any other sites are encountered during construction.</p> <p>Construction activities should be conducted carefully and all activities ceased if any archaeological, cultural and heritage resources are discovered. The SAHRA and LIHRA should be notified and investigation conducted before any activities can commence.</p> <p>The Heritage and Palaeontological study dated April 2014 only identified two potential heritage sites close to the proposed North PCD footprint, however, this was of low significance with no mitigation required. The South African Heritage Resources Information System (SAHRIS) tool indicated that the proposed project falls within the green zone which indicates moderate paleontological sensitivity. No palaeontological findings were made in the previous Heritage and Palaeontological study dated April 2014.</p>

3 BASIC ASSESSMENT PROCESS

3.1 PROCEDURAL FRAMEWORK

3.2 PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the EIA Regulations, 2014 (as amended), the objective of the impact assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—
 - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - The degree to which these impacts—
 - Can be reversed;
 - May cause irreplaceable loss of resources; and
 - Can be avoided, managed or mitigated
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - Identify and motivate a preferred site, activity and technology alternative;
 - Identify suitable measures to avoid, manage or mitigate identified impacts; and
 - Identify residual risks that need to be managed and monitored.

3.3 APPLICATION

The application phase consisted of completing the appropriate application form as well as the subsequent submission and registration of the application for EA with the DFFE. The application form was submitted to the DFFE on **3 March 2022**. The DFFE issued a reference number, 14/12/16/3/3/1/2493 following acknowledgment of receipt.

WSP notified a number of commenting authorities of the proposed project via a notification letter and by submitting the Draft BAR. The commenting authorities included:

- Department of Forestry, Fisheries and Environment: Biodiversity Conservation Unit;
- Limpopo Department of Economic Development, Environment and Tourism (LEDET);
- Department of Water and Sanitation (DWS);
- South African Heritage Resource Agency (SAHRA);
- Limpopo Heritage Resources Authority (LIHRA);
- Limpopo Department of Agriculture and Rural Development (LDARD);
- Waterberg District Municipality (WDM); and
- Lephalale Local Municipality (LLM).

WSP have collated comments received during the public review phase (3 March 2022 to 4 April 2022) and have compiled a Stakeholder Engagement Report (SER) attached to this Final BAR as [Appendix E-6](#).

3.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery and mapping. The specialist teams started site investigations on 13 January 2022 to provide impact assessments for the proposed project footprint.

3.5 IMPACT ASSESSMENT METHODOLOGY

The BAR uses a methodological framework developed by WSP to meet the combined requirements of international best practice and NEMA, Environmental Impact Assessment Regulations, 2014, as amended (GN No. 326).

As required by the EIA Regulations (2014) as amended, the determination and assessment of impacts is based on the following criteria:

- Nature of the impact;
- Significance of the impact;
- Consequence of the impact;
- Extent of the impact;
- Duration of the impact;
- Probability if the impact;
- Degree to which the impact:
 - can be reversed;
 - may cause irreplaceable loss of resources; and
 - can be avoided, managed or mitigated.

Following international best practice, additional criteria have been included to determine the significant effects. These include the consideration of the following:

- Magnitude: to what extent environmental resources are going to be affected;
- Sensitivity of the resource or receptor (rated as high, medium and low) by considering the importance of the receiving environment (international, national, regional, district and local), rarity of the receiving environment, benefits or services provided by the environmental resources and perception of the resource or receptor); and
- Severity of the impact, measured by the importance of the consequences of change (high, medium, low, negligible) by considering inter alia magnitude, duration, intensity, likelihood, frequency and reversibility of the change.

It should be noted that the definitions given are for guidance only, and not all the definitions will apply to all of the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

The significance of environmental aspects is determined and ranked by considering the criteria¹ presented in **Table 3-1**.

¹ The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

Table 3-1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE				
	1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30		31 to 60		61 – 100
Significance Rating (Negative (-))	Low (-)		Moderate (-)		High (-)
Significance Rating (Positive (+))	Low (+)		Moderate (+)		High (+)

3.5.1 MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact, and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures, and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this BAR.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. In the event that this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. In the event that impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail in order to remedy high/significant residual negative impacts. If no offsets can be done on a potential impact which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 3-1** below.

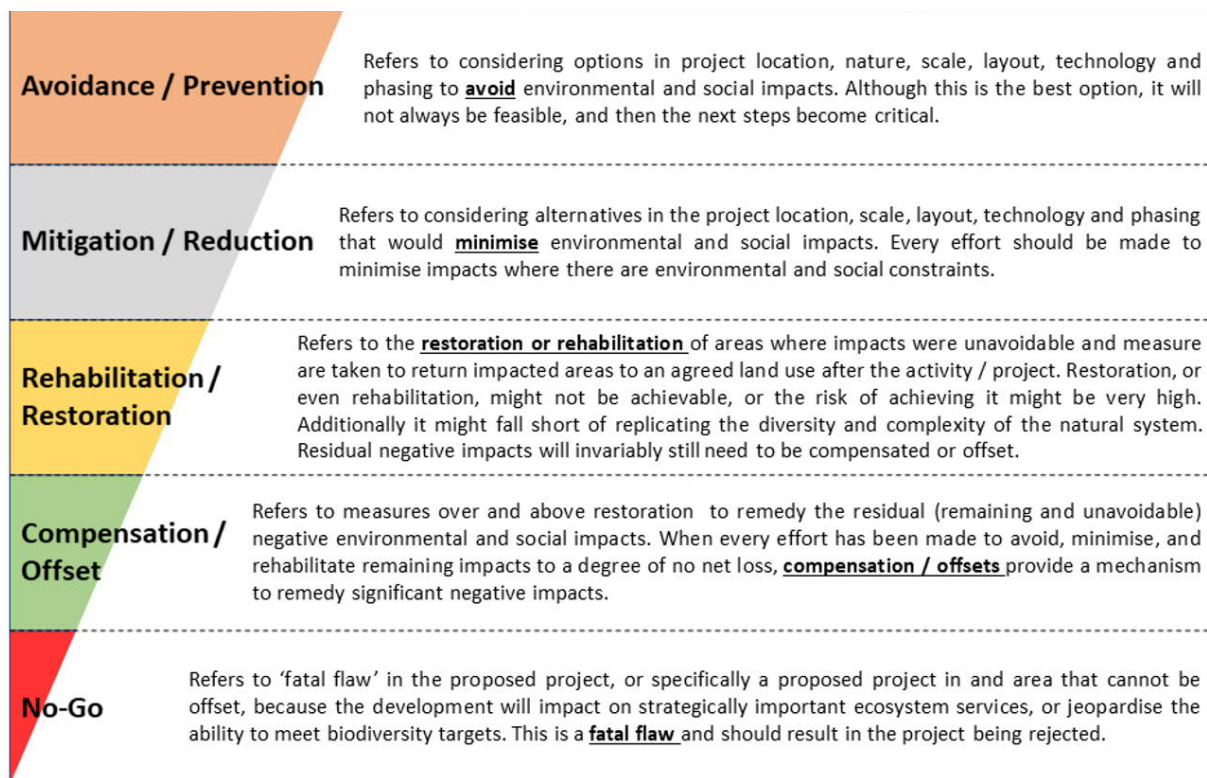


Figure 3-1: Mitigation Sequence/Hierarchy

3.6 STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement (public participation) is a requirement of the BA process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the BA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to

understand the risks, impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues and solutions.

The proposed public participation plan (PPP) below was approved by the DFFE on **18 January 2022** and the PPP along with the approval correspondence attached as **Appendix E5**.

3.6.1 STAKEHOLDER CONSULTATION

Table 3-2 below, provides the competent authority with the detailed process of the public participation process that was undertaken during the project.

The existing Matimba Power Station I&AP database was also utilised for this basic assessment process, due to its inclusivity. I&APs were provided with an opportunity to review and make comments on the Draft BAR.

Table 3-2: Proposed Public Participation Plan

SUMMARY OF PPP REQUIREMENT (GNR 326 OF EIA REGULATIONS)	PROPOSED PLAN/ACTIVITIES
<p>41(2) The person conducting a PPP must give notice to all potential I&APs by-</p> <p>(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—</p> <p style="padding-left: 20px;">(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and</p> <p style="padding-left: 20px;">(ii) any alternative site;</p>	<ul style="list-style-type: none"> – Placement of site notices (in English, Afrikaans and Sepedi) at six (6) appropriate locations on site and in the surrounding area. The site notice used is indicated in Appendix E-2 and proof of placement will be included in the Final BAR. – This will include the following: <ul style="list-style-type: none"> – Boundary/access road to the Matimba ADF; – Mogol Golf Club; – Ellisras Public Library; – Bosveld Supermarket; – Marapong Public Library; and – Lephalale Local Municipality.
<p>(b) giving written notice, in any of the manners provided for in section 47D of the Act, to—</p> <p style="padding-left: 20px;">(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;</p> <p style="padding-left: 20px;">(ii) owners, persons in control of, and occupiers of land adjacent to the site</p>	<ul style="list-style-type: none"> – Written notification (in English, Afrikaans and Sepedi) will be sent to owners and occupiers on or adjacent to the proposed project site, municipality ward councillor, local and district municipality, and relevant state departments. The advert published is indicated in Appendix E-1 and proof of placement will be included in the Final BAR. The advert was published on 25 February 2022. – General communication (written notification) with I&APs (public and government departments/authorities) throughout the basic assessment process. – All I&APs on the database will be notified of the project via email and SMS. This email will invite them to participate in the basic assessment process and will inform them of the public review period of the Draft BAR.

**SUMMARY OF PPP REQUIREMENT
(GNR 326 OF EIA REGULATIONS)**

PROPOSED PLAN/ACTIVITIES

<p>where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;</p> <p>(iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;</p> <p>(iv) the municipality which has jurisdiction in the area;</p> <p>(v) any organ of state having jurisdiction in respect of any aspect of the activity; and</p> <p>(vi) any other party as required by the competent authority;</p>	<ul style="list-style-type: none"> – I&APs will be added to the database (Appendix C) on request as the project progresses. – I&AP's already captured on Medupi's I&AP database will also be used
<p>(c) placing an advertisement in—</p> <p>(i) one local newspaper; or</p> <p>(ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;</p>	<p>An advert will be published in one local newspaper, the Mogol Post (in English, Afrikaans and Sepedi), formally announcing the commencement of the basic assessment process, requesting I&APs to register their interest in the project, and informing them of the release of the Draft BAR for public review and comment. The advert published is indicated in Appendix E-1 and proof of placement will be included in the Final BAR. The advert was published on 25 February 2022.</p>
<p>(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken</p>	<p>Even though the project does not extend beyond the boundaries of the District Municipality, an advert will be published in one regional newspaper, The Citizen (in English), formally announcing the commencement of the basic assessment process, requesting I&APs to register their interest in the project, and informing them of the release of the Draft BAR for public review and comment.</p>
<p>(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to—</p> <p>(i) illiteracy;</p> <p>(ii) disability; or</p> <p>(iii) any other disadvantage.</p>	<ul style="list-style-type: none"> – I&APs on the existing Matimba Power Station I&AP database will be contacted either telephonically or via email to verify their contact details as well as their preferred method of communication. – The relevant ward councillor will be contacted to ensure that community-based organisations are aware of the Project and can assist in distributing and communicating relevant Project information to community members. – Due to the prevailing COVID-19 restrictions, no provision has been made for a public meeting. – However, in the event that a meeting is requested, focus group meetings will be considered on a virtual platform.
<p>(42) A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority,</p>	<ul style="list-style-type: none"> – I&APs with a potential interest in the project will be identified at the outset of the project. – The I&AP database will be compiled to include all affected landowners and occupiers, adjacent landowners and occupiers, I&APs that formally registered during the previous EIA process, relevant authorities. As noted above, the existing database for Matimba Power Station will be used as the basis of the register for this basic assessment process. – All I&APs on the database will be notified of the project via email and SMS. The email and SMS will invite them to participate in the amendment process and will inform them of the public review period of the Draft BAR.

**SUMMARY OF PPP REQUIREMENT
(GNR 326 OF EIA REGULATIONS)**

PROPOSED PLAN/ACTIVITIES

	<ul style="list-style-type: none">– All I&APs identified will be registered on the project database, and the database will be maintained throughout the basic assessment process.
(43) & (44) Registered Interested and affected parties (I&APs) must be given 30 days to comment on the draft Report	<p>The Draft BAR will be made available to all I&APs for a 30-day comment period. Strict adherence to all COVID-19 protocols and regulations as well as best practice measures will be ensured throughout PPP. As a result, the Draft BAR will be made available to I&APs as follows:</p> <ul style="list-style-type: none">– From WSP on request; and– Online on the WSP website. <p>In the event that the report is requested from WSP, the report will be sent via Email.</p> <p>At the time of disclosure, WSP will confirm the relevant COVID-19 protocols and regulations in place and, should it be permissible, a hard copy of the Draft BAR will be placed at Ellisras Library, Marapong Public Library and Mogol Golf Club. <i>Note: WSP will confirm with the local libraries as to whether it is open and able to accept documents for public review prior to placement.</i></p> <p>An SER will be generated for inclusion in Final BAR for consideration by the competent authority.</p>

All stakeholders identified to date have been registered on the project stakeholder database. The EAP endeavoured to ensure that individuals/organisations from referrals and networking were notified of the proposed project. Stakeholders were identified at the horizontal (geographical) and vertical extent (organisations level). A list of stakeholders captured in the project database is included in **Appendix C**.

All concerns, comments, viewpoints and questions (collectively referred to as 'issues') received have been documented and responded to in the SER, which is included in this Final BAR.

Specialist studies for Biodiversity, Wetland and Heritage Assessment were conducted. The findings and recommendations from both studies have been incorporated in this Final BAR.

The site notices will serve to inform the occupiers of the land along with the newspaper advert and existing stakeholder database.

3.6.2 PUBLIC REVIEW

The Draft BAR was placed on public review for a period of 30 days from **3 March 2022** to **4 April 2022**, at the following public places:

- Mogol Golf Club;
- Ellisras Public Library;
- Marapong Public Library; and
- WSP website (<https://www.wsp.com/en-ZA/services/public-documents>).

All registered stakeholders and authorising/commenting state departments were notified of the public review period, with hard copy and electronic submissions made as required. Notifications of the location and availability of the Draft BAR were also sent via email and bulk sms (**Appendix E3** and **Appendix E4**).

The Final BAR will be made available to the competent and commenting authorities as well as the I&APs for perusal from **4 April 2022**.

3.7 ASSUMPTIONS AND LIMITATIONS

General assumptions and limitations relating to the BA process are listed below:

- The EAP hereby confirms that they have undertaken to obtain project information from the Client that is deemed to be accurate and representative of the project;
- The comments received in response to the public participation process, are representative of comments from the broader community; and
- The competent authority would not require additional specialist input, as per the proposals made in this report, in order to make a decision regarding the application.

The 2014 Biodiversity Assessment Report noted the following limitations:

- Findings, results, observations, conclusions and recommendations presented in this report are based on the authors' best scientific and professional knowledge as well as the interpretation of information available to them at the time of compiling this report.
- Due care and diligence is exercised by the authors, consultants and/or specialist investigators in rendering services and preparing this document. BEC, the consultants and/or specialist investigators accepts no liability for conclusions, suggestions, limitations and recommendations made in good faith, based on available information, or based on data that was obtained from surveys.
- The client, by accepting this document, indemnifies BEC, its members, consultants and/or specialist investigators against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by BEC and by the use of the information contained in this document.
- Results presented in this report are based on a snapshot investigation of the site alternatives and not on detailed and long-term investigations of all environmental attributes and the varying degrees of biological diversity that may be present in the site alternatives.
- This report is based on surveys that were conducted during a time that reflects an early summer period; although vegetation was found to be in a vegetative state, many plants could not be identified accurately due to the lack of reproductive material.
- Rare and endemic species normally do not occur in great densities and, because of customary limitations in the search and identification of Red Listed species, the detailed investigation of these species was not possible. Results are ultimately based on estimations and specialist interpretation of imperfect data.
- It is emphasised that information, as presented in this document, only have bearing on the site as indicated on accompanying maps. This information cannot be applied to any other area, however similar in appearance or any other aspect, without proper investigation.
- Furthermore, additional information may become known during a later stage of the process or development. The authors therefore reserve the right to modify aspects of the report including the recommendations should new information become available from ongoing research or additional work in this particular area, or pertaining to this investigation.
- This report should always be considered as a whole. Reading and representing portions of the report in isolation could lead to incorrect conclusions and assumptions. In case of any uncertainty, the authors should be contacted to clarify any viewpoints, recommendations and / or results.

The 2022 Biodiversity Technical Memorandum on the latest findings compared to the 2014 study indicated the following study limitations:

- The field visit comprised a high-level screening of on-site ecology, and was not aimed at conducting a detailed field surveying programme with the intention of developing comprehensive inventories of flora and fauna species present on-site.

The 2014 Heritage and Palaeontological Assessment Report noted the following assumptions and limitations:

- The unpredictability of archaeological remains occurring below the surface.
- It is assumed that the Social Impact Assessment and Public Participation Process might also result in the identification of sites, features and objects, including sites of intangible heritage potential in the alternative sites and linear infrastructures route and that these then will also have to be considered in the selection of the preferred site.
- It is assumed that a Paleontological Review (if required by SAHRIS or LIHRA) will be done by a suitably qualified specialist.

The 2022 desktop HIA exemption did not provide any assumptions and limitations

The 2014 Surface Water Assessment Report noted the following assumptions and limitations:

- Only surface water features within the footprint of the alternative sites and immediate surrounds were assessed in the field as part of this study; the study does not include an assessment of the wider catchments within which the surface water resources on the sites are located, although potential downstream impacts have been taken into account.
- The VEGRAI methodology has been partly applied in this study as the drainage lines on both of the alternative sites differ in terms of their hydrology and morphology from typical fluvial environments that are defined by central channel. Conversely the drainage systems in the study area are amorphous in terms of channel structure, with a significant component of the hydrological inputs into these systems are believed to be subterranean. It was thus difficult for certain aspects of the VEGRAI template to be applied to the drainage lines. Nonetheless the VEGRAI template was applied where possible.
- It should be noted that a worst-case scenario has been investigated in the context of assessment of impacts in this report. It is recognised that such a worst-case scenario may not necessarily materialise, however in the interests of risk aversion, and without more detailed design information, the worst-case scenario has been assumed.

Notwithstanding these assumptions, it is the view of WSP that this BA report provides a sound description of the issues associated with the project and the resultant impacts, and that the CA would be able to make a decision using this information.

4 PROJECT DESCRIPTION

This section provides a description of the location of the project area and the site location alternatives considered for the project. The descriptions encompass the activities to be done during the construction and operational phases as well as the consideration for site accessibility, water demand, supply, storage and site waste management as well as the needs and desirability of the project in accordance with Appendix 1 of GNR 326.

4.1 LOCATION OF THE PROPOSED PROJECT

The proposed PCDs and diversion trench will be on Portion 0 of Farm Zwartwater, 507/LQ in Lephalale, Ward 2, Lephalale Local Municipality, Waterberg District Municipality, Limpopo Province.

The proposed PCDs and diversion trench will be located on the land parcel outlined in **Table 4-1** below.

Table 4-1: Cadastral Information of the Site

DETAILS REQUIRED AS PER GN.R 326 ANNEX 1 (3) DETAIL

21 Digit Surveyor General Code of each Cadastral Land Parcel	T0LQ0000000050700000
Physical Address and Farm Name	Portion 0 of Farm Zwartwater, 507/LQ
Landuse Zoning	Industrial

The coordinates of the proposed infrastructure (North PCD, South PCD and Diversion trench) are outlined in **Table 4-2**, **Table 4-3** and **Table 4-4** respectively. The co-ordinates are further illustrated in **Figure 4-1**.

Table 4-2: North PCD Coordinates

POINTS	LATITUDE	LONGITUDE
A	23°42'25.69"S	27°35'49.38"E
B	23°42'28.49"S	27°35'52.26"E
C	23°42'34.14"S	27°35'45.35"E
D	23°42'31.27"S	27°35'42.50"E
Centre	23°42'30.21"S	27°35'47.25"E

Table 4-3: South PCD Coordinates

POINTS	LATITUDE	LONGITUDE
A	23°43'21.35"S	27°36'27.90"E
B	23°43'26.22"S	27°36'29.78"E
C	23°43'28.32"S	27°36'23.51"E

POINTS	LATITUDE	LONGITUDE
D	23°43'23.43"S	27°36'21.60"E
Centre	23°43'25.18"S	27°36'25.77"E

Table 4-4: Diversion Trench Coordinates

POINTS	LATITUDE	LONGITUDE
Start	23°43'29.09"S	27°36'15.42"E
Turn	23°43'21.77"S	27°36'21.85"E
End	23°43'17.55"S	27°36'40.32"E

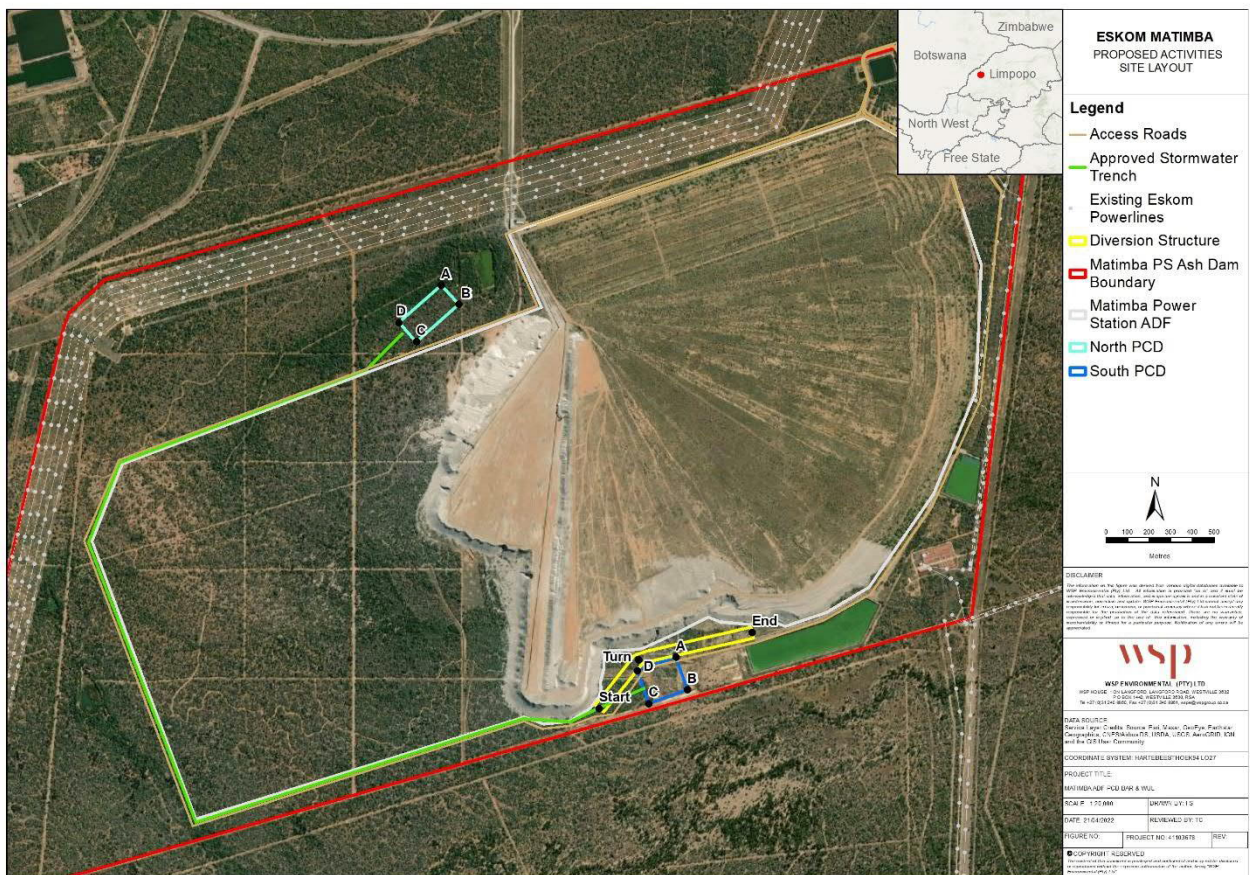


Figure 4-1: Proposed PCDs and Diversion Trench Layout

4.2 LAYOUT DESCRIPTION

4.2.1 CONSTRUCTION ACTIVITIES

The total footprint area that was authorised for the continuous ashing is 700 ha, comprising 510 ha on greenfields and 190 ha on top of the existing ADF (Piggybacking). While waiting for the ADF decision, the station applied for a 5-year Exemption from installing the required liner (a Class C liner) and an approval was granted for 95,5 ha on greenfields, on 10 February 2017. Matimba Power Station is currently ashing on the 95,5 ha authorised under exemption; and also commenced with Piggybacking operations in November 2020.

Following a revision of the site water balance during detailed design, it was noted that an additional two PCDs are required to contain surface runoff from the authorised ADF footprint. The design layout of the proposed PCDs is indicated in **Figure 4-2** below.

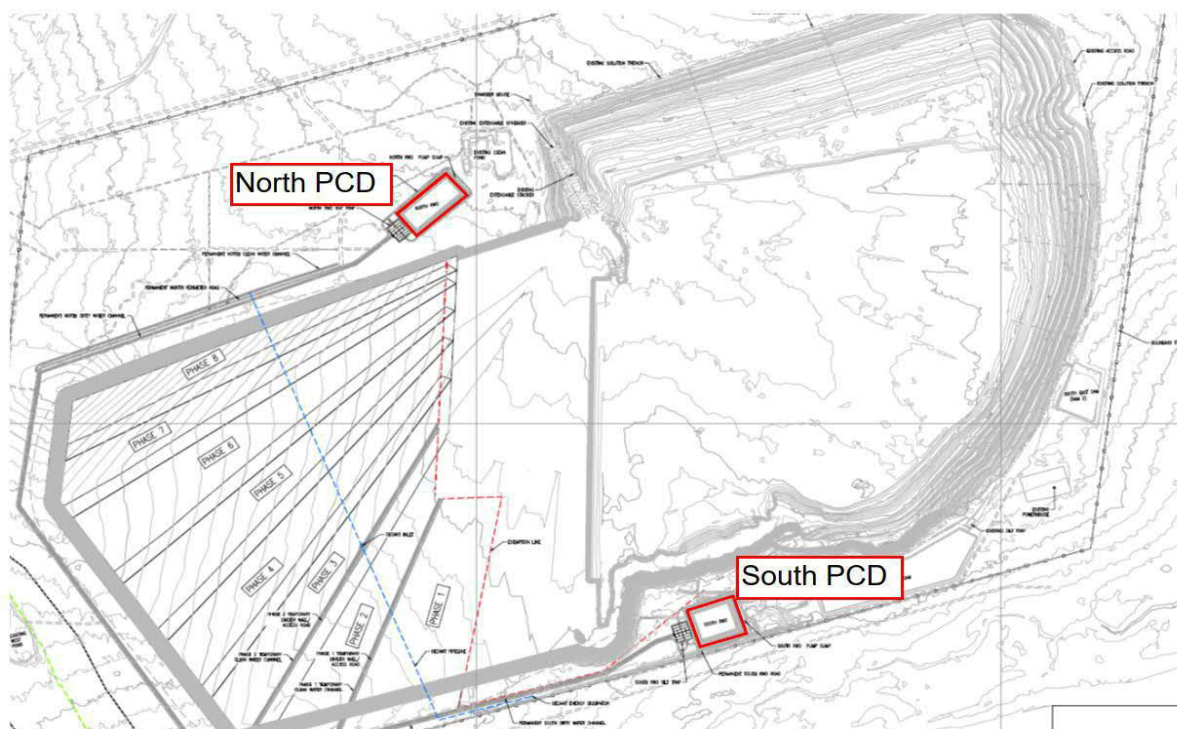


Figure 4-2: Proposed PCDs' Design Layout

The two proposed PCDs would be to the north (North PCD) and south (South PCD) of the existing ADF footprint.

Other infrastructure associated with the New South and North PCDs include:

- Collection channels/toe-canals;
- Pipelines from the South PCD to the existing Metsimaholo Dam;
- A pumping system from the South PCD to Metsimaholo Dam; and
- Fencing installed around the dams.

The proposed locations of the PCDs are in the same footprint that was initially assessed for the approved IEA of the ADF. The proposed locations are undisturbed and are currently densely vegetated. The dam specifications are indicated in **Table 4-5**.

Table 4-5: Proposed PCD Specifications

SOUTH DAM SPECIFICATIONS	NORTH DAM SPECIFICATIONS
<ul style="list-style-type: none"> – Volume = 80 000m³ – Max Depth (below ground) = 5m – Footprint = 5,94ha (includes the dam, silt trap and access road area) – Maximum Pumping Rate = 6 000m³/day – Catchment Area = 162 ha – Pipelines = 180 OD HDPE PE100 PN6.3 piping from New South Dam to Metsimaholo Dam - 300m length required 	<ul style="list-style-type: none"> – Volume: 60 000m³ – Max Depth (below ground) = 5m – Footprint = 4.35ha (includes the dam, silt trap and access road area) – Maximum Pumping Rate = 2 000m³/day – Catchment Area = 229 ha – Pipelines = 180 OD HDPE PE100 PN6.3 piping from New North Dam to existing Ash Dam 1 - 2300m length required

An approved collection trench surrounding the ADF will capture stormwater from the ADF and direct water to either of the proposed PCDs. Movable aboveground HDPE pipes will then be used to pump water from the PCDs to the surface of the ADF for dust suppression and irrigation. However, the stormwater collection trench was originally approved in the ADF IEA, however, it was proposed to channel water to the existing Metsimaholo Dam. The water will now run to either the north or south PCD before being reused for site operations. The proposed access roads will be along the collection trench.

During construction of the South PCD, a diversion of the collection trench is proposed to be constructed to channel water to the existing Metsimaholo Dam’s silt trap. A 50m wide servitude will be cleared for the diversion trench. The trench will allow operations and use of the Metsimaholo dam to continue before the South PCD is ready for use. During the operational phase, the diversion will also allow the South PCD to be cleaned of silt without affecting operations.

The contractor laydown area to be used for the construction of the PCDs and the diversion trench will be at the location that was originally approved for the ADF expansion. As such, no further clearance will be required in this regard.

4.2.2 OPERATIONAL ACTIVITIES

During the operational phase, there will be little to no movement along the footprint of the PCDs and the trench as they will mostly function autonomously. There will be minimal activity when maintenance is required. Limited impact is expected during operation since there will not be any intrusive work done outside of maintenance in the event that major damage occurs to site infrastructure.

4.2.3 DECOMMISSIONING ACTIVITIES

Decommissioning will be considered when the PCDs and the diversion trench are regarded obsolete and will be subject to a separate authorisation and impact assessment process. This is not expected to occur in the near future.

4.2.4 WASTE MANAGEMENT

Waste Management at the project site will be undertaken in line with the EMP to consider the correct disposal of general and hazardous waste generated on the project. **Table 4-6** describes the different waste products that the proposed project will produce, as well as the various options to dispose of them. Waste will mainly be generated during the construction phase. During operation, site personnel are only on the site for limited amount of time as and when maintenance is required.

Table 4-6: Waste Management Options

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
Hydrocarbons (Contaminated soil)	Hazardous	<p>Fuel and oil spillages can be a source of contamination of water sources and the soil. Management options include:</p> <ul style="list-style-type: none"> – Using spill kits to clean any spillages; – Ensure storage facilities are maintained and meet industry regulations; – Transportation and storage of fuel must be regulated and correctly managed according to the EMPr; – Waste generated must be taken to the contractor laydown area at the end of each day; – Co-ordinate waste removal with the removal of waste from the contractor laydown area at the Matimba ADF; and – All hazardous waste is to be disposed of at a registered hazardous landfill (safe disposal certificates must be obtained).
Contaminated Personal Protective Equipment (PPE)	Hazardous	<p>PPE can be contaminated during handling of hydrocarbons. Management options include:</p> <ul style="list-style-type: none"> – Store contaminated PPE in hazardous waste skips at the project area; – Waste generated along must be taken to the contractor laydown area at the end of each day; – Co-ordinate waste removal with the removal of waste from the contractor laydown area at the Matimba ADF; and – Ensure contaminated PPE is disposed of at a registered hazardous landfill (safe disposal certificates must be obtained).
General waste	General	<p>General waste (inorganic matter) can be disposed of as per normal and form part of the municipal waste management system. Management options include:</p> <ul style="list-style-type: none"> – Ensure waste is stored securely in refuse bins; – Waste generated along must be taken to the contractor laydown area at the end of each day; and – Co-ordinate waste removal with the general removal of waste from the contractor laydown area at the Matimba ADF.
Food waste	General	<p>Food waste is generated as site personnel take their meals on the construction site. Management options include:</p> <ul style="list-style-type: none"> – Store any waste and packaging into a labelled food waste bin; – Waste generated along must be taken to the contractor laydown area at the end of each day; – Co-ordinate waste removal with the removal of waste from the contractor laydown area at the ADF; and – Co-ordinate waste removal with the general removal of waste from the Matimba ADF.

4.3 NEEDS AND DESIRABILITY OF THE PROJECT

The Needs and Desirability Guidelines highlights the need to consider how the geographical, physical, biological, social, economic and cultural species of the environment that may be affected by the proposed activity. As indicated before, following a revision of the site water balance during detailed design of the approved ADF expansion, it was noted that an additional two PCDs are required to contain surface runoff from the authorised

ADF footprint. As such, the North and South PCDs are proposed supported by the diversion trench to be constructed to allow operations to continue until the South PCD is in place.

The ADF function is necessary for the continuation of the electricity generation activities at Matimba Power Station. As such, the supporting infrastructure related to the operation of the ADF will be necessary

5 ALTERNATIVES

In terms of the EIA Regulations, feasible alternatives are required to be considered within this Final BAR. All identified, feasible alternatives are required to be evaluated in terms of social, biophysical, economic and technical factors. However, since this section discusses the alternatives and provides key reasons (motivation) for elimination upfront as they will not be feasible, only the preferred option will be assessed in the impact assessment in **Section 7**.

A key challenge of the BA Process is the consideration of alternatives. Most guidelines use terms such as ‘reasonable’, ‘practicable’, ‘feasible’ or ‘viable’ to define the range of alternatives that should be considered.

Essentially, there are two types of alternatives:

- Incrementally different (modifications) alternatives to the project; and
- Fundamentally (totally) different alternatives to the project.

Fundamentally different alternatives are usually assessed at a strategic level, and EIA practitioners recognise the limitations of project-specific BAs to address fundamentally different alternatives. Project level alternatives such as site selection and technology alternatives have been addressed below.

5.1 LOCATION

No alternatives were considered with regards to the location of the PCDs, however, this is due to a limited footprint available considering the proposed future developments on the ADF. The dams were located in their current positions in order to maximize the available space for ashing operations.

The South PCD footprint is in an area with limited space as it is close to the boundary and the existing Metsimaholo Dam. The new south dam is located next to the existing Metsimaholo dam and this area will not receive any further ash. The proposed South PCD footprint is the most feasible location as there is limited space in this area and allows for collection of stormwater on the southern face of the PCD. The only activity that should occur in the southern footprint in the future is rehabilitation of the ash dump slopes

The proposed North PCD footprint was selected by the design team within an area that has similar sensitivities. There are already impacted areas available around the ADF boundary where the North PCD could be placed as the majority is already under use and allows for future expansions. As such, the proposed North PCD footprint is in an already assessed location which was done during the original ADF expansion project. The new north dam is to be located at the top of the ash dump near the ash conveyor transfer house. This was to maximise the undeveloped area marked in blue (Figure 5-1) which was earmarked as a potential storage/disposal area for the future. As such, this leaves no other locations for the proposed North PCD.

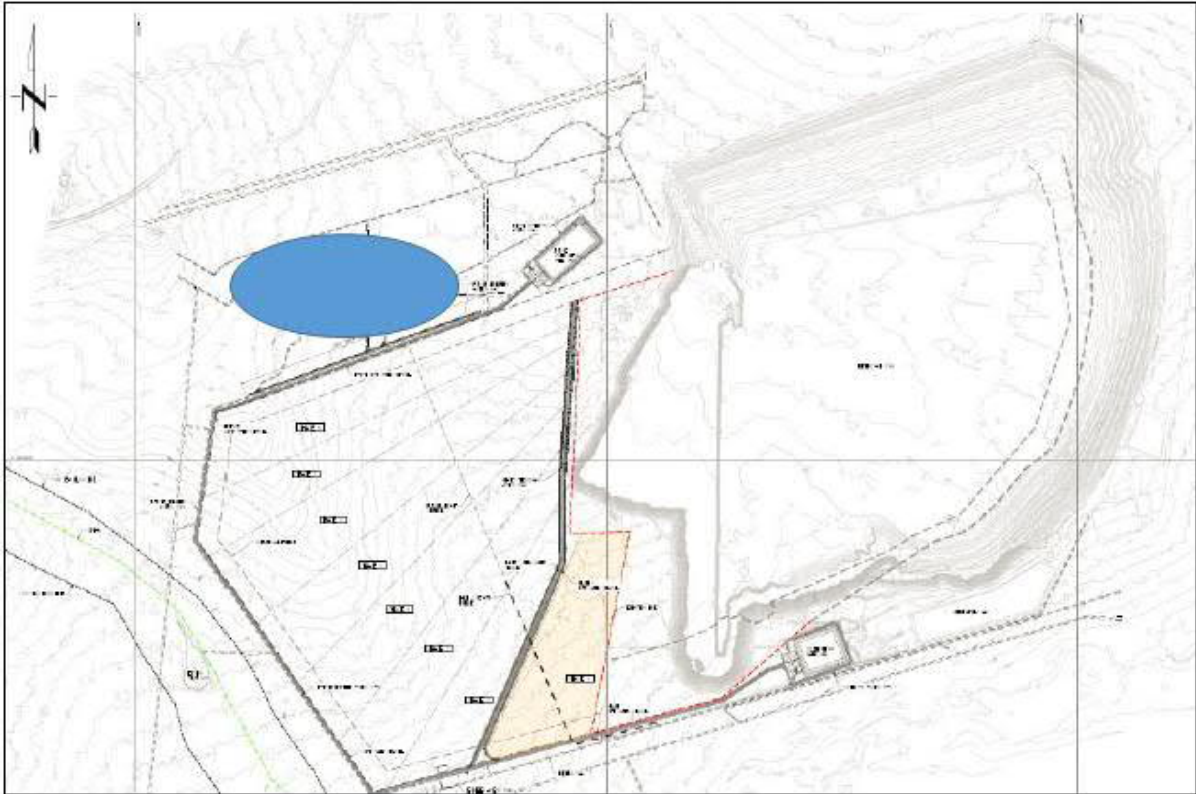


Figure 5-1: Detailed Design Footprint

5.2 TECHNOLOGY

At this point, movable aboveground HDPE pipes will then be used to pump water from the PCDs to the surface of the ADF for dust suppression and irrigation. However, Eskom is also investigating the possibility of using below ground pipelines which will be more secure and less susceptible to damage.

5.3 ACTIVITIES

The PCDs are required due to the findings from the detailed design and revised water balance to contain the stormwater that arises from the ADF surface. The diversion trench may not be constructed if the authorisation process is concluded with enough time on the project construction schedule, thus limiting the potential impact from clearances.

5.4 NO-GO ALTERNATIVE

The no-go alternative is not suitable as the expanded ADF will not have sufficient containment facilities to hold the stormwater that arises from its surface. As such, the EAP motivates for approval of the proposed project.

In conclusion, the proposed locations of the PCDs are the preferred options as there are no viable locations due to space limitations as per the proposed future development plans on the ADF footprint. The use of aboveground HDPE pipelines is preferred as it allows for flexibility and also avoids additional excavation activities on the ADF footprint. The PCDs are the preferred activity as they are the only method available to contain stormwater volumes and prevent contamination of the surrounding environment.

6 BASELINE ENVIRONMENT

This section provides a description of the baseline environment of the project area. The descriptions encompass the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326. The information in this section was obtained from the following sources:

- Biodiversity Impact Assessment Report of the Proposed Continuous Ash Disposal Facility and Linear Infrastructure Route for Matimba Power Station, Limpopo Province, compiled by Bathusi Environmental Consulting, dated July 2014.
- Surface Water Impact Assessment Study for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Royal Haskoning DHV, dated June 2015.
- Hydrological Assessment Report for the Proposed Matimba Ash Disposal and Conveyor, compiled by GCS on behalf of Royal Haskoning DHV, dated April 2015.
- Hydrogeological Study for the Ash Disposal Facility for the Matimba Power Station and Conveyor Belt, compiled by GCS on behalf of Royal Haskoning DHV, dated May 2014.
- Soils, Land Use, Land Capability and Agricultural Potential Survey for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Terra Soil Science, dated March 2014.
- Geological and Geotechnical Investigation for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by DMT Kai Batla on behalf of Royal Haskoning DHV, dated April 2013.
- Air Quality Impact Assessment for the Matimba Power Station Continuous Ash Disposal Facility, compiled by Royal Haskoning DHV, dated March 2014.
- Visual Impact Assessment for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Royal Haskoning DHV, dated June 2015.
- Social Impact Assessment for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Royal Haskoning DHV, dated April 2014.
- Heritage and Palaeontological Impact Assessment for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Royal Haskoning DHV, dated April 2014.
- Noise Impact Assessment for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Royal Haskoning DHV, dated July 2014.
- Traffic Impact Assessment for the Proposed Continuous Ash Disposal Facility for the Matimba Power Station, Limpopo Province, compiled by Royal Haskoning DHV, dated March 2014.
- Biodiversity Technical Memorandum for the Proposed Eskom Matimba Power Station Ash Disposal Facility Pollution Control Dams, Lephalale, Limpopo Province, compiled by Golder, dated 31 January 2022.
- Letter for HIA Exemption Request for the Proposed Eskom Matimba Power Station Ash Disposal Facility Pollution Control Dams, Close to Lephalale, Limpopo Province, compiled by Professor Anton van Vollenhoven of Archaetnos Culture & Cultural Resource Consultants, dated 12 January 2022.
- Groundwater GAP Analyses Memorandum for the Proposed Eskom Matimba Power Station Ash Disposal Facility Pollution Control Dams, Lephalale, Limpopo Province, compiled by Golder, dated 1 February 2022.

6.1 CLIMATE

6.1.1 REGIONAL CLIMATE

The Lephalale area climate is characterised by hot summers and mild winters. The long-term annual average rainfall is 485mm, of which 420mm falls between October and March. The area experiences high temperatures, especially in the summer months, where daily maxima of >40°C are common with an average annual temperature of 21.1°C. Rainfall acts as a natural pollution suppressant, which may have had a contributory effect in suppressing pollutant concentrations.

The climate within the Lephalale Municipality and Limpopo Province in general results in a negative climatic water balance, and very little water for utilisation by industry, mining, agricultural and domestic land use. The Lephalale climograph is shown in **Figure 6-1** below.

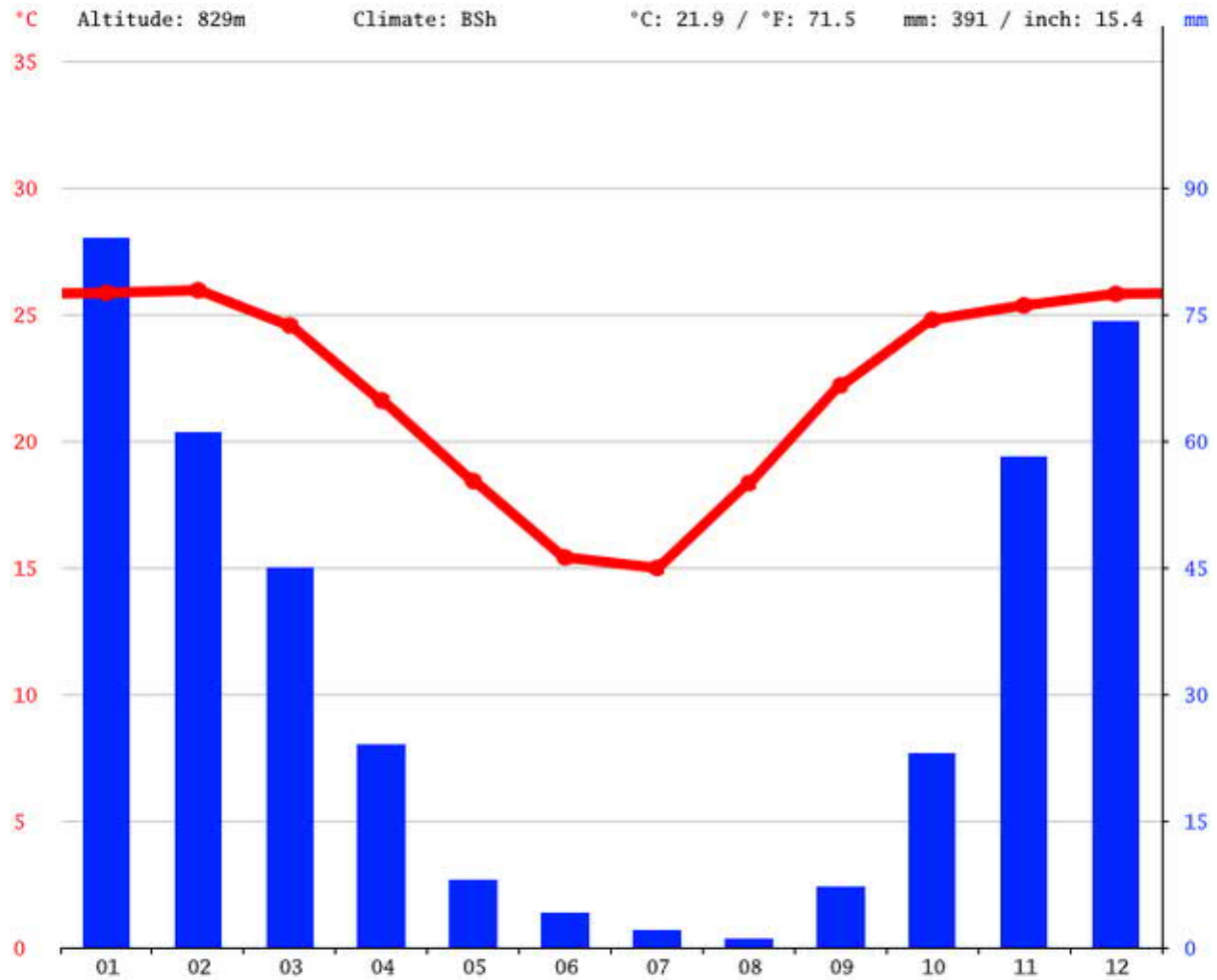


Figure 6-1: Lephalale Climograph (Source: climate-data.org as per January 2022)

The difference in precipitation between the driest month and the wettest month is 83 mm. The variation in annual temperature is around 11.0°C as shown in **Figure 6-2** below.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C	25.8 °C	25.9 °C	24.6 °C	21.6 °C	18.4 °C	15.4 °C	15 °C	18.3 °C	22.2 °C	24.8 °C	25.3 °C	25.8 °C
(°F)	(78.5) °F	(78.7) °F	(76.2) °F	(70.9) °F	(65.1) °F	(59.7) °F	(59) °F	(65) °F	(71.9) °F	(76.6) °F	(77.6) °F	(78.4) °F
Min. Temperature °C	20.5 °C	20.6 °C	19.2 °C	15.9 °C	11.6 °C	8.4 °C	7.6 °C	10.6 °C	14.4 °C	17.5 °C	19.1 °C	20.3 °C
(°F)	(68.9) °F	(69.1) °F	(66.6) °F	(60.6) °F	(52.9) °F	(47.2) °F	(45.7) °F	(51.1) °F	(58) °F	(63.5) °F	(66.4) °F	(68.5) °F
Max. Temperature °C	31.2 °C	31.4 °C	30 °C	27.4 °C	25.2 °C	22.5 °C	22.4 °C	26 °C	29.9 °C	32 °C	31.6 °C	31.4 °C
(°F)	(88.2) °F	(88.5) °F	(86.1) °F	(81.3) °F	(77.3) °F	(72.5) °F	(72.3) °F	(78.8) °F	(85.8) °F	(89.5) °F	(88.9) °F	(88.6) °F
Precipitation / Rainfall	84	61	45	24	8	4	2	1	7	23	58	74
mm (in)	(3.3)	(2.4)	(1.8)	(0.9)	(0.3)	(0.2)	(0.1)	(0)	(0.3)	(0.9)	(2.3)	(2.9)
Humidity(%)	53%	51%	53%	54%	49%	50%	45%	37%	33%	36%	44%	52%
Rainy days (d)	8	6	5	3	1	1	0	0	1	3	6	8
avg. Sun hours (hours)	9.5	9.5	9.0	8.5	9.1	8.9	9.1	9.6	9.7	10.0	9.8	9.6

Figure 6-2: Lephalale Historical Data / Climate Table (Source: climate-data.org as per January 2022)

The month with the highest relative humidity is April (53.60 %). The month with the lowest relative humidity is September (32.70 %). The month with the highest number of rainy days is December (10.67 days). The month with the lowest number of rainy days is August (0.43 days).

6.1.2 TEMPERATURE

As mentioned before, the Lephalale area experiences high temperatures, especially in the summer months, where daily maxima of $>40^{\circ}\text{C}$ are common with an average annual temperature of 21.1°C . The warmest month of the year is January, with an average temperature of 26.0°C . The variation in annual temperature is around 12.0°C . At 14.0°C on average, June is the coldest month of the year as shown in **Figure 6-3** below.

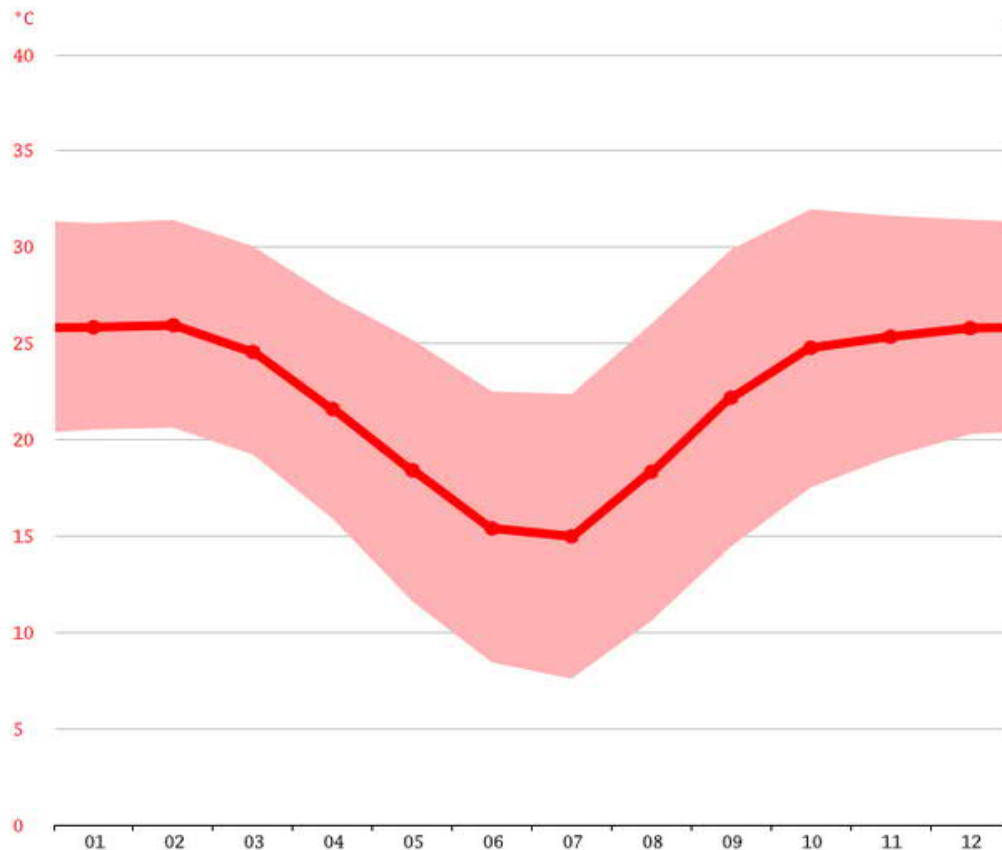


Figure 6-3: Lephalale Temperature Graph (Source: climate-data.org as per January 2022)

6.1.3 RAINFALL

The long-term annual average rainfall is 485mm, of which 420mm falls between October and March. The difference in precipitation between the driest month and the wettest month is 83 mm. The average monthly precipitation is shown in **Figure 6-4** below and also illustrates the number of days specific precipitation amounts are expected on a monthly basis.

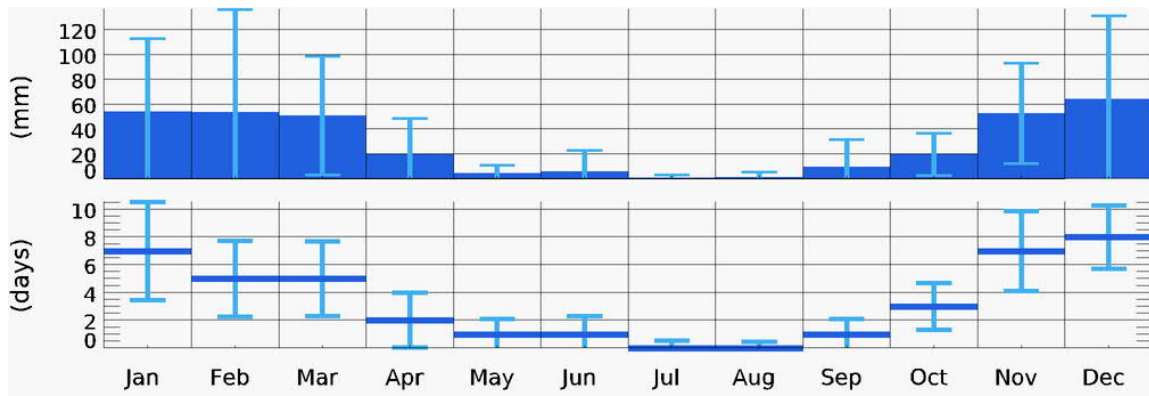


Figure 6-4: Lephalele Monthly Precipitation (Source meteoblue.com as per January 2022)

6.1.4 LOCAL WIND FIELD

Based on the available meteorological data, winds originate predominantly from the South West to the North East. Wind speeds are generally slow to moderate. Calm conditions, which are defined as wind speeds less than 1 m/s, occur infrequently. The chart in **Figure 6-5** below shows the days per month the wind reaches a certain speed around the Lephalele area.

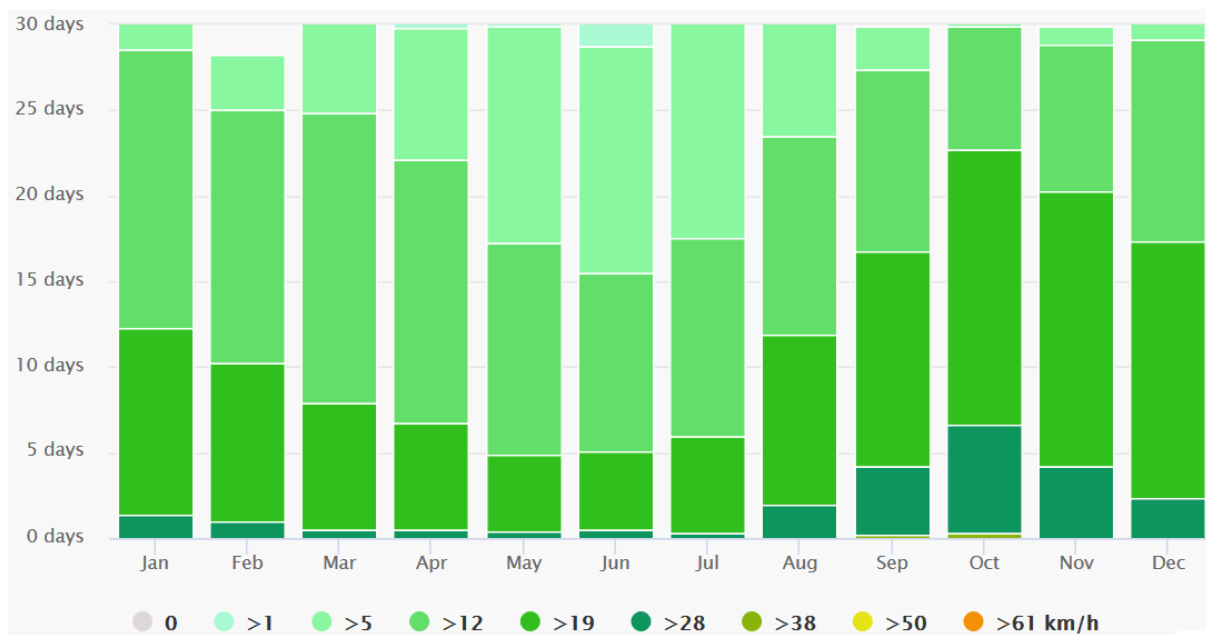


Figure 6-5: Lephalele Airport Wind Speed Chart (Source meteoblue.com as per January 2022)

The wind rose in **Figure 6-6** below shows how many hours per year the wind blows from a particular direction around the Lephalele area.

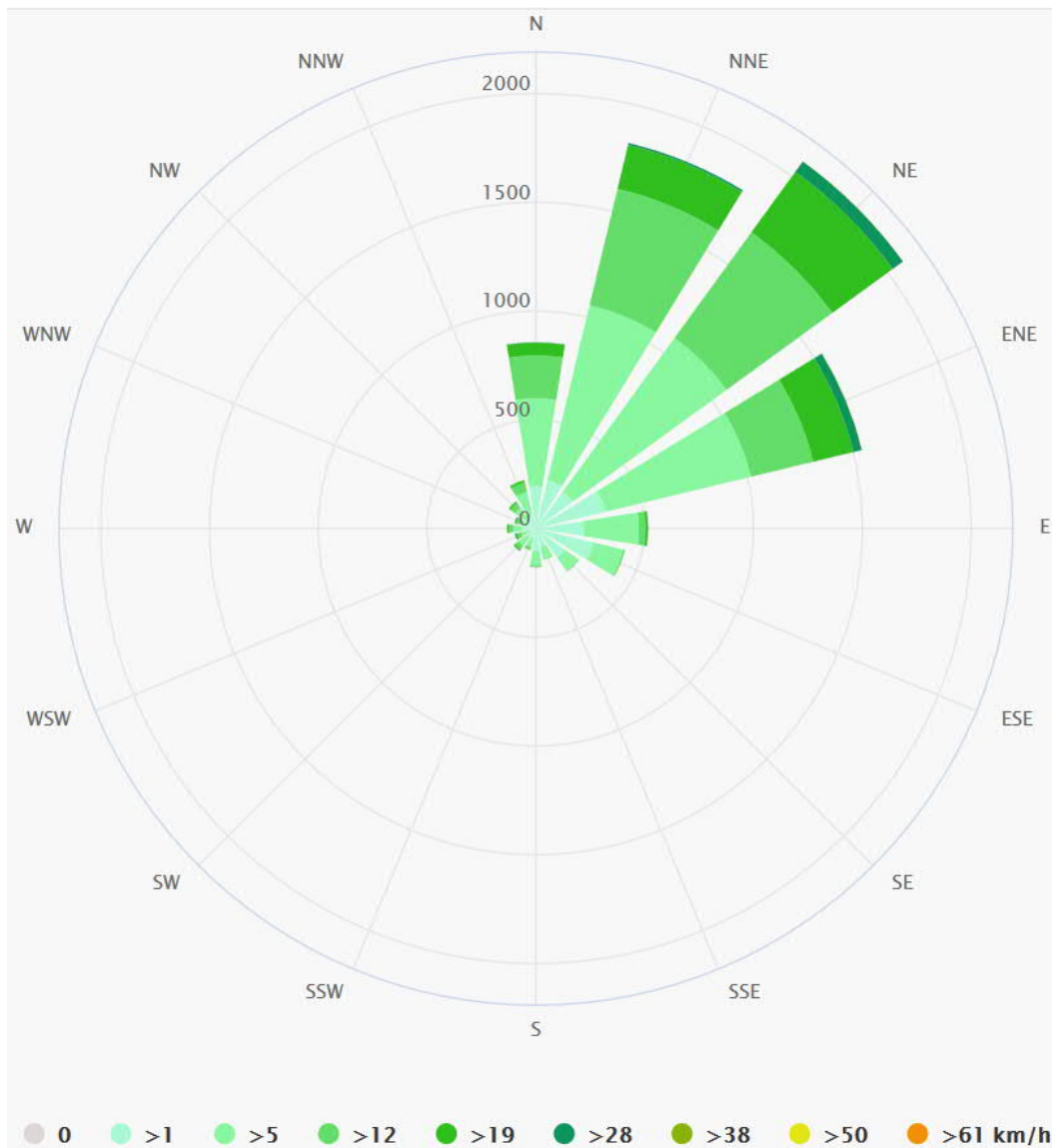


Figure 6-6: Lephalale Airport Wind Rose (Source meteoblue.com as per January 2022)

6.2 TOPOGRAPHY

The topography is relatively flat around the Onverwacht / Matimba Power Station area and extending to the north and west. These landscape characteristics mark a change from the area to the south of the town of Lephalale where much more hilly and incised topography, forming part of the Waterberg foothills, exists.

In a more localised context, the topography on and around the site of the proposed development slopes very gently and almost imperceptibly down to the south and the east, towards the very poorly defined valley bottom that is drained by the Sandloop River. The Sandloop is a non-perennial river that runs east-west in close proximity to the south of the proposed project footprint. To the south of the river the topography slopes gently up towards the higher-lying ground in the south, where the Waterberg conglomerates outcrop as a series of low rocky outcrops. The site topography with regards to the proposed project footprint is indicated in **Figure 6-7** below.

6.3.2 LOCAL GEOLOGY

The general geology of the site is characterised by Aeolian (wind-blown) sands of the Karoo Supergroup, which overlie conglomerate and sandstone bedrock of the Waterberg Group, Sandriviers Formation. The Aeolian sands are described as dry to very slightly moist, yellowish/orange brown to reddish brown, medium dense to dense becoming very dense with depth, fine grained, silty sand. This layer extends to top of bedrock, at depths in the range 1.0 – 2.0 m below existing ground level.

The conglomerate bedrock occurs as outcrops in some areas. The conglomerate is described as greyish/yellowish/orange brown to purplish grey, moderately to highly weathered, fine to coarse grained (with numerous sub-rounded to sub-angular pebbles), moderately to highly fractured, medium hard rock.

The sandstone bedrock underlies the conglomerate and is described as greyish/orange-brown to pinkish brown, highly to moderately weathered, moderately bedded, highly fractured/jointed, soft rock (becoming progressively slightly weathered and medium hard to hard with depth). In some instances, conglomerate is absent and the Aeolian sandy soils are underlain directly by sandstone bedrock. The site geology is shown in **Figure 6-8**.

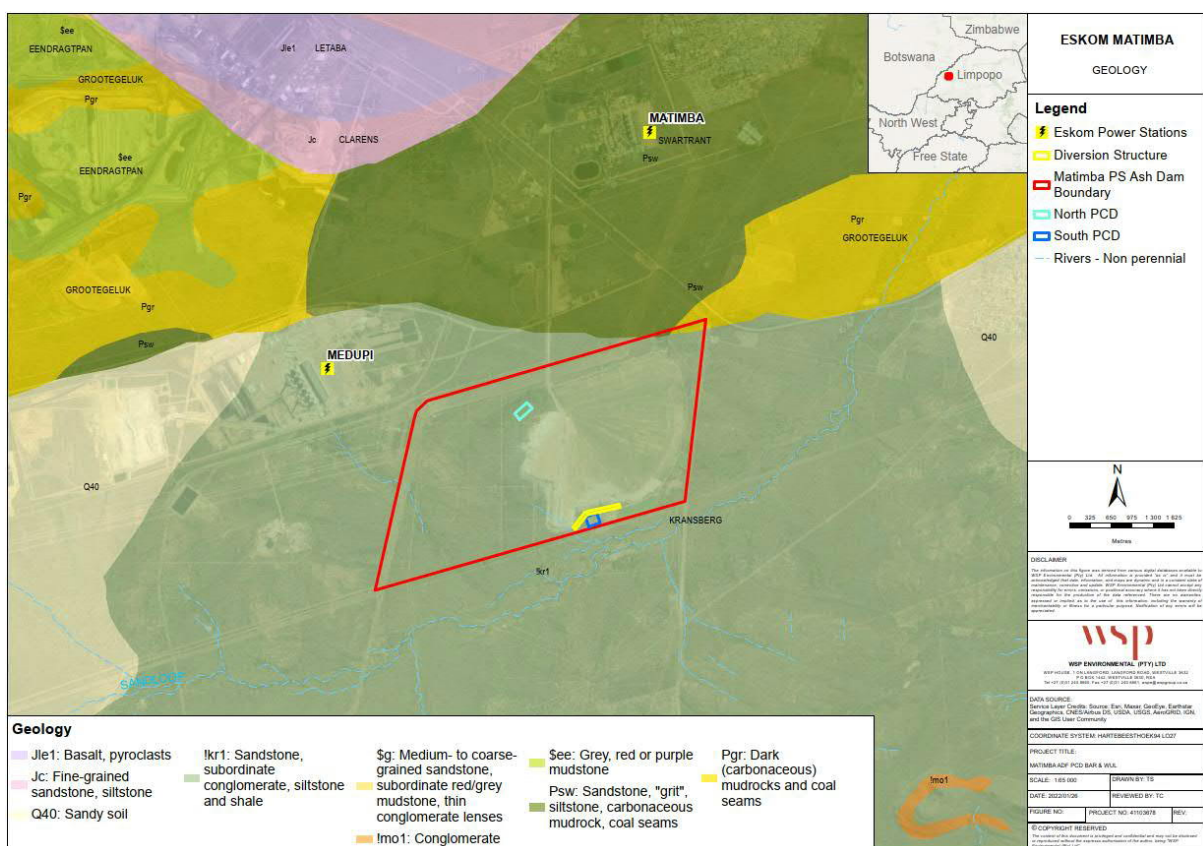


Figure 6-8: Geology Map

6.4 GEOHYDROLOGY

According to the 1:500 000 Geohydrological Map of Polokwane 2326, the South PCD area, south of the Eenzaamheid fault as well as the Grootegeluk Formation is mostly associated with fractured aquifers based on the geology. The average groundwater yields associated with these aquifers, range from 0.5-2 l/s.

6.4.1 GROUNDWATER LEVELS

Data collected from the National Groundwater Archive (NGA) boreholes, from the Department of Water Affairs as well as the GRIP (Groundwater Resource Information Project) database for the 8 km radius (with the Matimba Power Station which is the source of the ash as the centre point) indicated water levels ranging from 1.83 to 60.96 m below ground level (mbgl) measured between 1953 and 1972.

Monitoring borehole data obtained for the Matimba Power Station indicated water levels ranging from 2.75 mbgl to 29.95 mbgl.

An extensive groundwater monitoring network surrounds the Grootegeluk mine with a large proportion located within the 8 km buffer area. The water levels in these boreholes ranged from 3 mbgl to 60.95 mbgl. The variation in water levels is possibly due to the de-watering activities of the Grootegeluk open cast mining to the west of the 8 km buffer.

6.4.2 GROUNDWATER DIRECTION

The water level data obtained from the Matimba monitoring programme and selected data from the Grootegeluk monitoring was used to contour the groundwater levels and determine the groundwater flow direction. The groundwater flow direction around the study area is an easterly direction towards the Sandloop River.

6.4.3 GROUNDWATER USE

Groundwater abstraction in the area occurs for the following purposes:

- Primarily stock or game watering;
 - Domestic use;
 - Agricultural use; and
 - Reticulated (piped) water is supplied to the area, either via the Municipality, Eskom, or Grootegeluk Coal Mine.
-

6.5 SURFACE WATER

6.5.1 MACRO-DRAINAGE CHARACTERISTICS

The study area is in a dry region of the country where surface water flow is not present all year round. The Sandloop River is the major natural surface water resource that was identified near the study area. The river is a tributary of the Mokolo River, draining a catchment to the south-west of Lephalale and joining the Mokolo River to the north of the town.

The river is non-perennial and is defined by a sandy bed with a distinctive associated riparian zone. The river is thought to be episodic, i.e. only flowing after rainfall events. The Sandloop River drains in an east-west direction near the South PCD area, and then northwards to the west of the farm Onverwacht. The Sandloop River drains into the Limpopo primary catchment. Within this wider context, it forms part of the Crocodile River sub-catchment, which drains much of the Highveld and western Bushveld. The study area falls within the A42J quaternary catchment. This is the catchment of the lower-most reaches of the Mokolo River that drains north from the Waterberg Hills into the Limpopo River.

6.5.2 SURFACE WATER TYPOLOGY

Surface water drainage is relatively poorly defined in the wider study area and there is a low drainage density. The low drainage density is likely to be due to the flat terrain, along with the sandy nature of soils and relatively low rainfall. The dominant soil form on the two sites is the Clovelly soil form that is deep and of sandy texture.

Where drainage occurs, the most commonly-occurring expression of surface water drainage is the ephemeral drainage line. Distinct linear / fluvial drainage features occur very sparsely, however drainage lines do occur on the site.

The largest drainage features are three ephemeral watercourses (the Sandloop that drains the area to the west and south of the study area and two of its tributaries which emanate from the area to the north of Marapong) which are tributaries of the Mokolo. The three watercourses are relatively poorly defined in terms of hydromorphological structure. The only perennial river in the wider area is the Mokolo –draining the Waterberg Hills to the south where a greater amount of rainfall occurs. The proposed development is expected to be too distant to adversely affect this river, although it is a downstream surface water receptor.

Typical wetlands (i.e. palustrine habitats) were found to be relatively rare in the context of the study area and the intervening area, with hydric soils only occurring within very limited parts of the site. The tributary of the Sandloop that rises to the north of Marapong displays hydric soils within depressions along its length.

Pan / depression wetlands are characterised by their endorheic character and are circular to oval shape. They occur in relatively small enclosed basins and are typically ephemeral in nature, typically being filled with shallow water levels during the rainy season. The relatively flat terrain, along with the presence of sedimentary strata of the Karoo Supergroup on which much of the pans within South Africa occur (and the current and historical presence of large herbivores within this sweetveld vegetation type, suggests conditions favourable for the formation of pans. Pans occur all over the wider area, however they occur somewhat sparsely. **Figure 6-9** below shows the rivers and wetlands as well as the corresponding tributaries around the site.

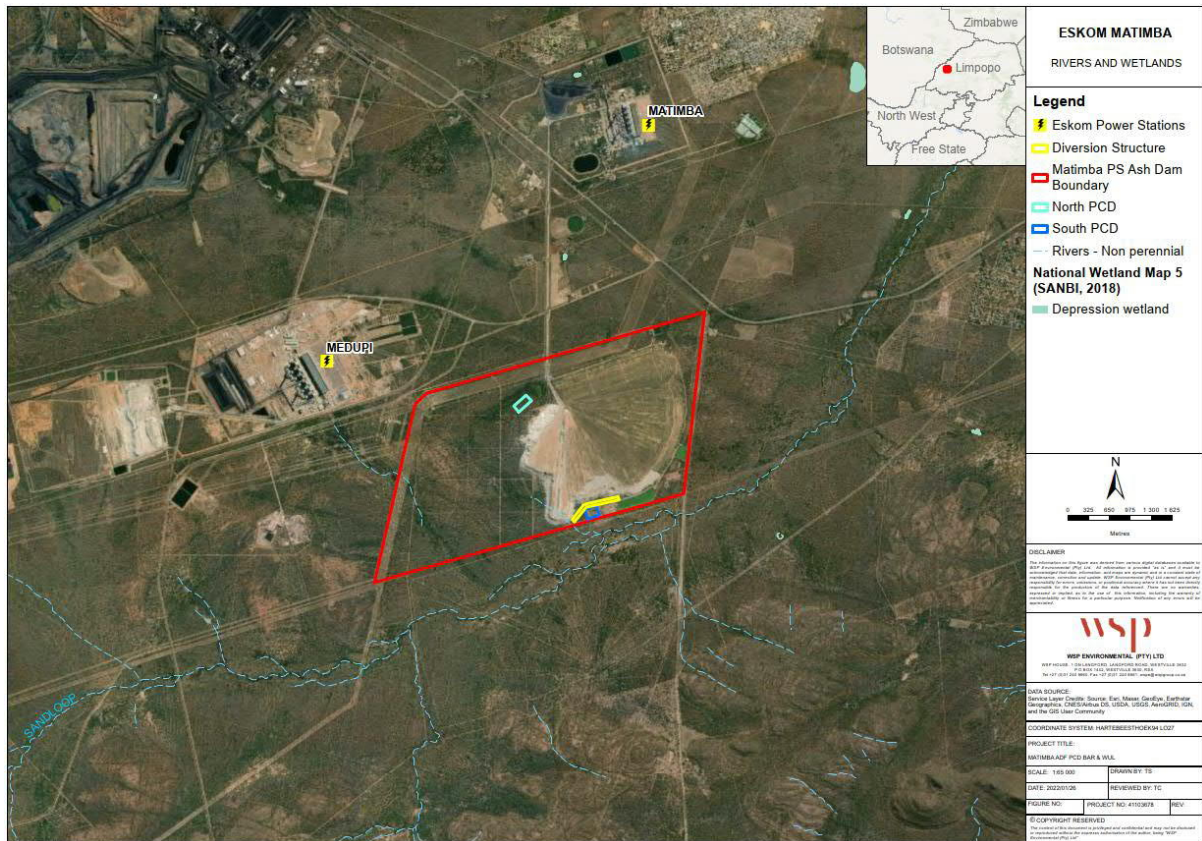


Figure 6-9: Rivers and Wetlands Map

The Screening Tool report identified a high sensitivity with regards to aquatic biodiversity, with a potential freshwater ecosystem priority area quarternary catchments. However, these were not identified during the desktop assessment and with no key features identified during the site visit in this respect.

6.5.3 HYDROMORPHOLOGY (HYDROLOGY AND GEOMORPHOLOGICAL PROCESSES) OF EPHEMERAL DRAINAGE LINES

Hydrological and geomorphological processes are the major drivers of surface water feature formation. Rivers and drainage lines as surface water features are defined by their position in the landscape (typically occurring in valley bottoms) and typically by the presence of a distinctive channel. The ephemeral drainage lines however do not typically display a distinctively incised channel, with certain reaches displaying only a very shallow depression (<30 cm deep) that would barely constitute a channel. Some reaches even display no clear channel, rather being characterised by bare patches of soil below) or being characterised by different vegetation cover to the surrounding woodland (less woody vegetation and a grassier substrate).

A few small pan-like depressions are present in the study area. These depressions occurred in the context of a very flat gradient, and are areas of collection of surface water flow along the drainage system. The flat gradient in which these drainage lines occur is believed to account for the indistinct hydromorphological definition of the drainage lines. These drainage systems appear to vary between slightly more hydromorphologically defined reaches in areas of slightly increased slope to areas where there appears to be no defined channel, with only a change in vegetation structure indicating a surface water or drainage feature.

6.6 SOILS AND AGRICULTURAL POTENTIAL

The study area falls within the Bd46 land type. The soils in this area are predominantly variable depth apedal (structureless), sandy to sandy loam light coloured soils that are eutrophic. Structured soils occur sporadically in lower lying landscape positions. The depression areas are characterised by soils with signs of incipient pedogenesis in the form of cutanic character and alluvial stratification.

The land capability and land use within the Bd46 land type is predominantly extensive grazing due to climatic constraints in terms of dryland crop production. Due to the level terrain soil erosion is not a major factor. The land type has low agricultural potential due to the relatively low and erratic rainfall (around 500 mm per year). Certain areas can be used for irrigated crop production but then only if adequate water (quantity and quality) is available.

6.7 BIODIVERSITY

6.7.1 FLORA

Vegetation in the region is defined by Mucina and Rutherford (2006) as the Limpopo Sweet Bushveld. This vegetation type extends from the lower reaches of the Crocodile and Marico Rivers down the Limpopo River valley. It is short, open woodland dominated by *Acacia mellifera* and *Dichrostachys cinerea* as well as taller tree species such as *A. robusta*, *A. burkei* and *Terminalia sericea*. The high palatability of the graminoid (i.e. grasses) composition renders this vegetation type highly suitable for game farming practices.

In their study, Bathusi (2014) identified and mapped one main floristic community (viz. *Kyphocarpa angustifolia* – *Eragrostis rigidior* Woodland Community), comprising four variations in the landscape to the west of the Matimba ADF. Of the four variations, the *Acacia nigrescens* – *Melhanian forbesii* Woodland Variation is the most widespread, and according to the Bathusi (2014) vegetation map covers the proposed north PCD Site. The proposed south PCD footprint is not located within the area mapped by Bathusi (2014).

The *Acacia nigrescens* – *Melhanian forbesii* Woodland Variation occurs on deep sandy to loam soils, although variations in clay content were also noted by Bathusi (2014). Characteristic species noted by Bathusi (2014) in this variation include *Senegalia nigrescens* (= *Acacia nigrescens*) and *Spirostachys africana*, while other noted woody species include *inter alia*; *Combretum apiculatum*, *Dichrostachys cinerea*, *Euclea undulata*, *Grewia flava*, *Grewia flavescens*, *Senegalia erubescens* (= *Acacia erubescens*) and *Terminalia sericea*.

Five nationally protected tree species (*Senegalia erioloba*, *Boscia albitrunca*, *Combretum imberbe*, *Sclerocarya birrea* subsp. *cafra* and *Securidaca longepedunculata* var. *longepedunculata*) and one provincially protected tree species (*Spirostachys africana*) were recorded by Bathusi (2014). All variations under the *Kyphocarpa*

angustifolia – *Eragrostis rigidior* Woodland Community were rated as having a medium-high floristic sensitivity (Bathusi, 2014).

Ninety-eight fauna species were recorded by (Bathusi, 2014). These included 19 mammals, 53 birds, three reptile, one amphibian species, and 22 invertebrate species. Of these, three were considered threatened, namely the Tawny Eagle (*Aquila rapax*), Leopard (*Panthera pardus*) and Brown Hyaena (*Parahyaena brunnea*). Several additional fauna species of conservation concern were also noted to potentially occur in the area, based on historic distributions (refer to Bathusi, 2014). The *Kyphocarpa angustifolia* – *Eragrostis rigidior* Woodland Community was rated as having a medium-high faunal sensitivity (Bathusi, 2014).

The flora species is classified under the following categories:

- A species is Data Deficient when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.
- A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
- A species is Rare when it meets at least one of four South African criteria for rarity, but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria.
- A species is Threatened when it is included in one of the Critically Endangered (Possibly Extinct), Critically Endangered, Endangered or Vulnerable categories.

The following conservation important plant taxa were recorded during the survey period:

- *Acacia erioloba* (Declining, Protected Tree);
- *Boscia albitrunca* (Protected Tree);
- *Combretum imberbe* (Protected Tree);
- *Sclerocarya birrea* (Protected Tree)
- *Securidaca longepedunculata* var. *longepedunculata* (Protected Tree); and
- *Spirostachys africana* (Provincially protected).

No threatened or Red Data plant species were recorded during the brief survey period. However, protected tree species are within the study area. In particular, *Acacia erioloba*, *Boscia albitrunca* and *Spirostachys africana* were recorded in significant numbers. The submission of permit applications to authorities is therefore required. A suitable study needs to be conducted in order to determine the number and densities of protected species affected by the development.

Detailed descriptions of the Red Data plant taxa known to occur in the ¼-degree grids that are spatially represented in the site are provided in the 2014 Biodiversity specialist report (**Appendix F-1**).

The site falls within an Ecological Support Area (ESA) 1 as shown in **Figure 6-10** below. Detailed descriptions of these floristic habitats are provided in the 2014 Biodiversity specialist report (**Appendix F-1**).

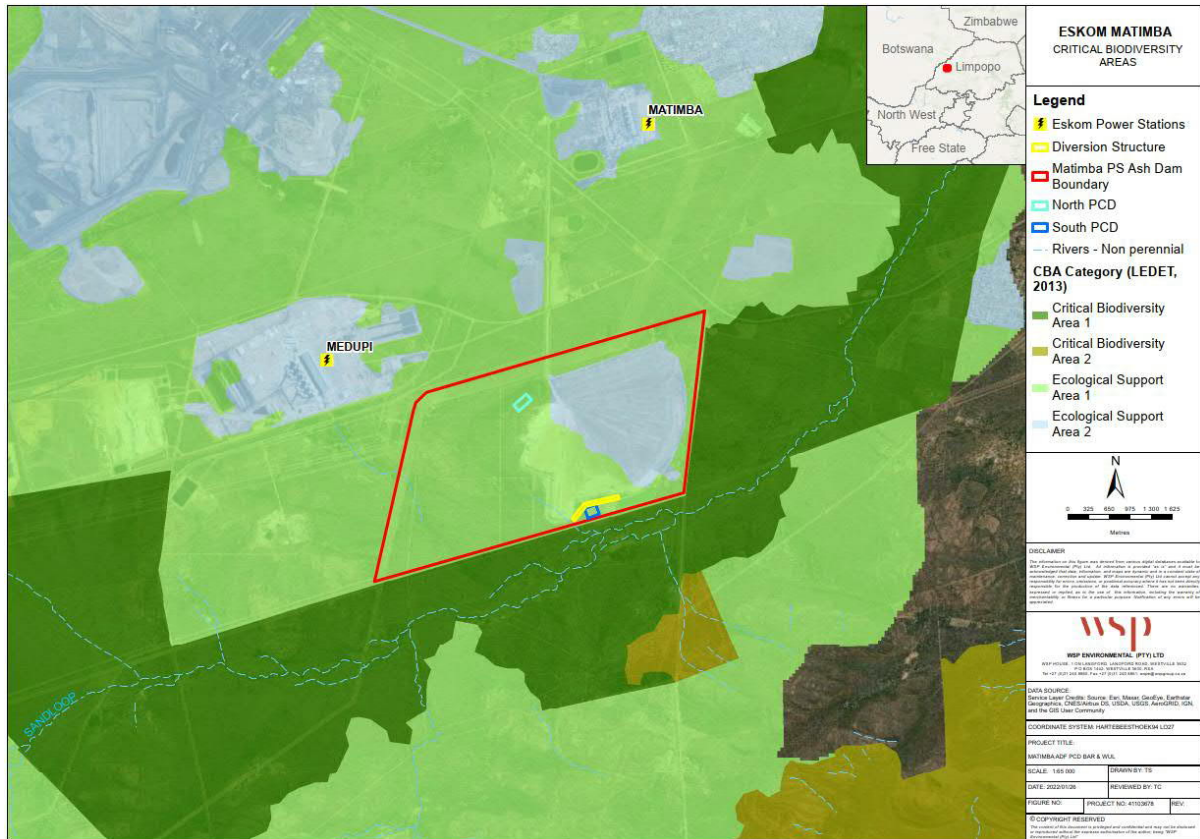


Figure 6-10: Critical Biodiversity Areas Map

FLORISTIC HABITAT TYPES OF THE STUDY AREA

The following communities and variations are present across the study area:

- *Nymphaea – Schoenoplectus* Impoundments Community;
 - *Typha capensis* Variation;
 - *Brachiaria nigropedata* Variation;
- *Kyphocarpa angustifolia – Eragrostis rigidior* Woodland Community;
 - *Croton gratissimus - Sclerocarya birrea* – Gravel Plains Variation;
 - *Acacia nigrescens – Melhania forbesii* Woodland Variation;
- *Vernonia species - Panicum maximum* Degraded Woodland Community;
 - *Stipagrostis uniplumis – Eragrostis pallens* Sandveld Variation;
 - *Acacia mellifera – Acacia tortilis* Alluvial Plains Variation;
- *Portulaca – Oldenlandia* Sheetrock Community; and
- Artificial woodland habitat.

PROPOSED SOUTH PCD SITE

The proposed south PCD footprint and large portions of the proposed diversion structure route are highly modified by past vegetation clearing and earth works associated with the operations of the Matimba ADF. These areas are characterised by large earthen berms created to impound and channel water, scattered ash deposits/residue, soil mounds/heaps and exposed soil surfaces (**Figure 6-11** to **Figure 6-14**). Another important feature is an ephemeral drainage line located 25m from the boundary of the proposed PCD footprint (**Figure 6-10**). Where it is present, vegetation mostly comprises a secondary, sub-climax community of short, open bushveld. Woody vegetation is dominated by fine-leaved species, such as regenerating *Dichrostachys cinerea*, *Senegalia erubescens* and *Vachellia grandicornuta* trees, with some broad-leaf species (e.g., *Grewia flava*) present. The herbaceous layer is

grass dominated, with several species locally abundant including *inter alia*; *Chloris virgata*, *Dactyloctenium aegyptium*, *Enneapogon cenchroides*, *Eragrostis trichophora*, *Tragus berteronianus* and *Urochloa mossambicensis*. The adjacent artificial water impoundment structure is characterised by species preferring moist soils condition such as *Cynodon dactylon*, *Echinochloa colona*, *Panicum* sp., *Typha capensis*, *Sporobolus* cf. *consimilis* and Cyperaceae species. Alien invasive species are also common across the site, with *Nicotiana glauca* and *Flaveria bidentis* particularly abundant. Both these species are listed as Category 1b invasive species, under the NEMBA.

Portions of the proposed diversion structure route are also characterised by patches of relatively undisturbed natural habitat. These patches typically comprise short, closed thicket. Consistent with bottomland areas characterised by clayey soils, they are dominated by fine-leaved woody species, such as *Senegalia erubescens*, *Senegalia mellifera*, *Senegalia nigrescens*, *Vachellia grandicornuta*, *Vachellia tortilis* subsp. *heteracantha* and *Dichrostachys cinerea* (see Figure 6-15). Other woody species recorded include *Boscia albitrunca*, *Boscia foetida*, *Combretum apiculatum*, *Euclea undulata*, *Grewia flava*, *Grewia flavescens*, *Peltophorum africanum* and *Ziziphus mucronata*. Commonly recorded grasses include *inter alia*; *Eragrostis trichophora*, *Panicum maximum* and *Urochloa mossambicensis*.

Although not abundant, protected trees were recorded at this site, including *Boscia albitrunca* - which is listed as a nationally protected tree according to Schedule A of the National Forests Act (Act No. 84 of 1998), and *Spirostachys africana* - which is listed as Protected according to the Limpopo Environmental Management Act (Act No. 7 of 2003).

Based on **Figure 6-10** and **Table 6-1**, the majority of vegetation cover in the south PCD is Mines and Industrial Areas covering an area of 52.3%. although highly degraded, south PCD site still has significant amount of natural habitat and comprise important habitat for fauna.

Table 6-1: Vegetation Communities

CATEGORIES	AREA (HA)	AREA PERCENTAGE (%)
Degraded Woodland	0.5	5.3
Mines and Industrial Areas	5	52.3
Woodland	4.1	42.4
Total	10	100

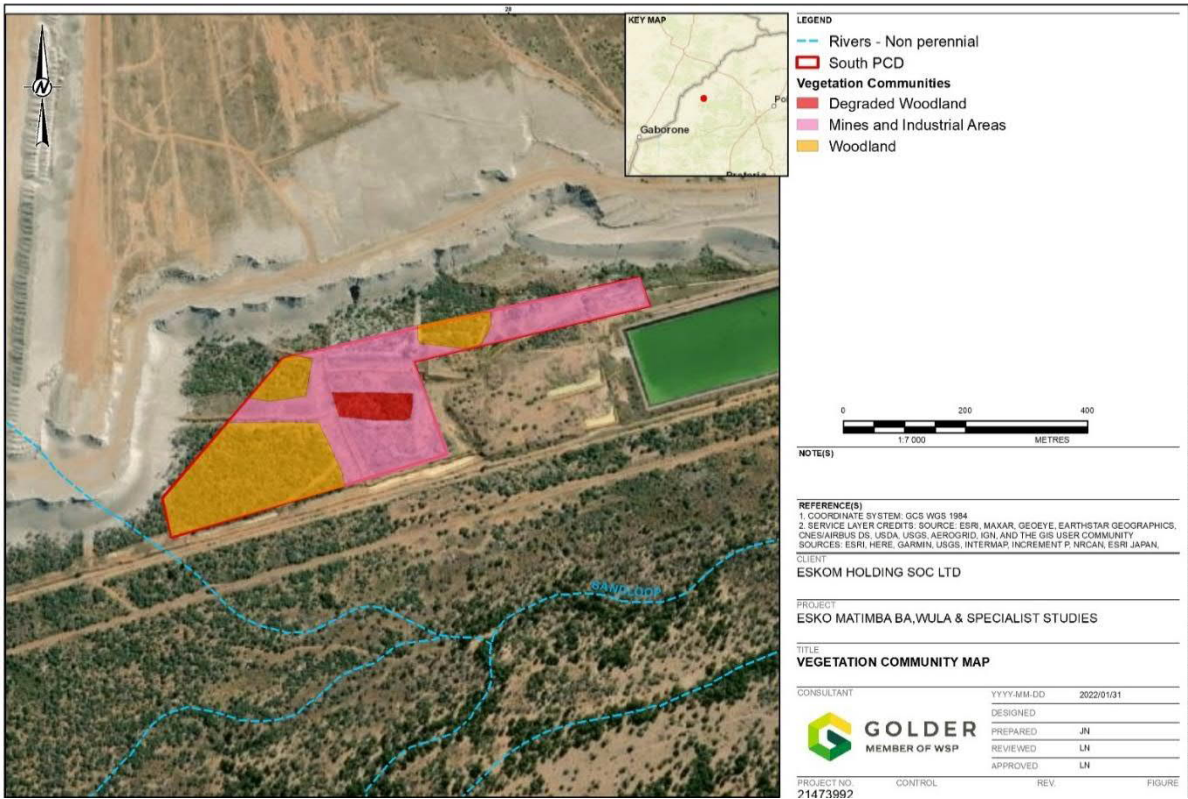


Figure 6-11: South PCD Vegetation Communities



Figure 6-12: View over the proposed South PCD footprint. The site is highly modified and dominated by secondary vegetation



Figure 6-13: Earthen berms and ash residue, adjacent to the proposed South PCD footprint. Note abundance of *Nicotiana glauca* (NEMBA Category 1b AIS)



Figure 6-14: Artificial water impoundment



Figure 6-15: Patch of relatively undisturbed *Acacia* thicket, located adjacent to the proposed South PCD footprint

PROPOSED NORTH PCD SITE

The proposed north PCD site is characterised by undisturbed, natural bushveld that occurs on upland sandy to loam soils and is typical of the vegetation of the broader region. Vegetation structure is variable, and ranges from low, open woodland to relatively tall, closed woodland (**Figure 6-10**). Lower-, mid- and upper woody strata are generally well-defined.

In terms of composition, woody vegetation comprises a mixture of broad- and fine-leaved species. Common species in the upper woody stratum include *Sclerocarya birrea* subsp. *caffa*, *Senegalia burkei* and *Senegalia nigrescens*. In the lower and mid strata, several woody species are abundant, such as *Combretum apiculatum*, *Combretum zeyheri*, *Dichrostachys cinerea*, *Grewia bicolor*, *Grewia flava*, *Grewia flavescens*, *Grewia monticola* and *Terminalia sericea*.

The herbaceous layer is well-developed and comprises a mixture of grasses and forbs. Common grasses include, *inter alia*; *Aristida congesta* subsp. *congesta*, *Digitaria eriantha*, *Eragrostis trichophora*, *Panicum maximum*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides* and *Urochloa mossambicensis*. Common forbs recorded include *inter alia*; *Abutilon forbesii*, *Commelina benghalensis*, *Hibiscus* species, *Melhania acuminata* and *Waltheria indica*.

Protected trees recorded at this site include *Combretum imberbe*, *Sclerocarya birrea* subsp. *caffa*, and *Vachellia erioloba*. These are listed as nationally protected trees, according to the National Forests Act (Act No. 84 of 1998). One listed alien invasive species, *viz. Cereus jamacaru* (NEMBA Category 1b), was recorded at this site.



Figure 6-16: Tall, closed woodland in the proposed North PCD Site



Figure 6-17: Open woodland in the proposed North PCD Site

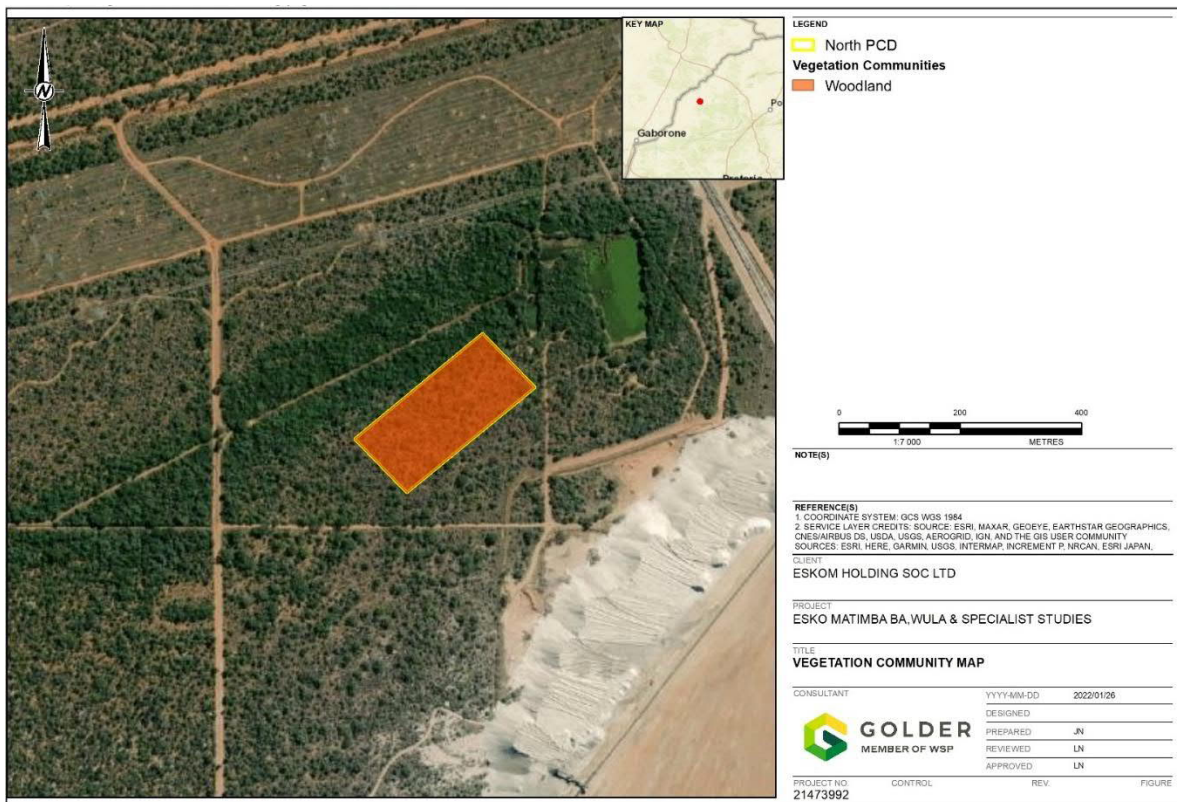


Figure 6-18: North PCD Vegetation Community

The Screening Tool report identified a high sensitivity with regards to aquatic biodiversity, with a potential freshwater ecosystem priority area quaternary catchments. However, these were not identified during the desktop assessment and with no key features identified during the site visit in this respect.

6.7.2 FAUNA

Savannas of Limpopo have experienced recent impacts resulting from anthropogenic activities. The presence of minerals such as coal has led to significant transformation, degradation and fragmentation of the region's grasslands. It is therefore important to view the respective site alternatives on an ecologically relevant scale; consequently, all sensitive animal species (specific faunal groups) known from the Limpopo Province were included in this assessment. Detailed regional and scientific data on all faunal groups are lacking (notably for most

of the invertebrate groups) and as a result only data sets on specific faunal groups allow for habitat sensitivity analyses based on the presence/ absence of sensitive faunal species (Red Data species) and their specific habitat requirements.

Animals known to be present in the ¼-degree grid 2327DA were considered potential inhabitants (all species known from the Limpopo Province were included in the assessment to limit the known effects of sampling bias).

During previous and ongoing studies in the immediate vicinity of the site alternatives during the past years, a total of 332 animal species have been confirmed to occur around the alternatives and within the immediate surrounds (approximately an area of 100 km²). These include:

- 53 invertebrate species;
- 9 frog species;
- 20 reptile species;
- 204 bird species; and
- 46 mammals.

The diversity of animals recorded in the region included eighteen Red Data species, namely:

- Giant Bullfrog: *Pyxicephalus adspersus*;
- Black Stork: *Ciconia nigra*;
- Secretarybird: *Sagittarius serpentarius*;
- White-backed Vulture: *Gyps africanus*;
- Tawny Eagle: *Aquila rapax*;
- Martial Eagle: *Polemaetus bellicosus*;
- Lesser Kestrel: *Falco naumanni*;
- Kori Bustard: *Ardeotis kori*;
- Red-billed Oxpecker: *Buphagus erythrorhynchus*;
- Bushveld Elephant Shrew: *Elephantulus intufi*;
- Ground Pangolin: *Manis temminckii*;
- Bushveld Gerbil: *Tatera leucogaster*;
- Cheetah: *Acinonyx jubatus*;
- Brown Hyena: *Parahyaena brunnea*;
- Honey Badger: *Mellivora capensis*;
- Southern Sable Antelope: *Hippotragus niger*; and
- Western Tsessebe: *Damaliscus lunatus*.

The diversity of animals recorded include two **Alien and Invasive species**, namely:

- *Acridotheres tristis* (Common Myna); and
- *Equus asinus* (Donkey).

FAUNAL HABITAT TYPES OF THE STUDY AREA

Although both proposed PCD sites are located adjacent to the completely modified ADF, they do form part of or are surrounded by, large areas of natural bushveld habitat. Despite the large adjacent areas of transformation and the presence linear infrastructure, such as roads, powerline servitudes, railways and fences, habitat connectivity across the surrounding landscape remains high. The movement and dispersal of unmanaged free-roaming wildlife populations is therefore probably only moderately restricted. This is supported by the observation of large mammals on-site during the 2022 field visit, including Warthog (*Phacochoerus aethiopicus*), Chacma Baboon (*Papio ursinus*) and Impala (*Aepyceros melampus*). Undisturbed natural vegetation associated with both the proposed PCD site footprints is therefore considered to likely support fauna species of conservation concern such as the Tawny Eagle (*Aquila rapax*), Leopard (*Panthera pardus*) and Brown Hyaena (*Parahyaena brunnea*), identified in the Bathusi (2014) study.

The Screening Tool report identified a high sensitivity with regards to aquatic biodiversity as listed above, with a potential freshwater ecosystem priority area quaternary catchments. However, these were not identified during the desktop assessment and with no key features identified during the site visit in this respect.

6.8 AIR QUALITY

6.8.1 IDENTIFIED SENSITIVE RECEPTORS

A sensitive receptor for the purposes of the current investigation can be defined as a person or place where involuntary exposure to pollutants released by the proposed PCDs and diversion trench activities, can be expected to take place.

For the purposes of this study, areas of development such as residential, industries educational and recreational areas are identified as sensitive receptors. The receptors identified during the current study include:

- Lephhalale Town (including Marapong and Onverwacht townships);
 - Ubuntu Occupational Health Services;
 - Several guest houses;
 - Doctors practices;
 - Local airstrip;
 - Matimba Power Station;
 - Medupi Power Station;
 - Farm houses; and
 - Game reserves.
-

6.8.2 SOURCES OF AIR POLLUTION

Based on an aerial photo and site description of the area, the following sources of potential air pollution have been identified in the area:

- Matimba Power Station;
- Matimba ADF;
- Medupi Power Station;
- Veld fires;
- Domestic fuel burning at the surrounding township;
- Vehicle entrainment;
- Agriculture; and
- Mining Operations (Grootegeluk Colliery).

The proposed PCDs and diversion trench are expected to have minimal impact on the identified sensitive receptors with regards to dust and particulate matter due the nature of activities. Minimal dust and particulate matter generation will be expected during the construction phase when excavations are done with stockpiles management required.

6.8.3 STANDARDS AND GUIDELINES

The main pollutants of concern which may pose a health risk to surrounding sensitive receptors and possible communities during the current investigation are particulate matter and dust. An overview is provided of the available local regulations and standards (SANS), and then for comparison, international guidelines and standards prescribed for inhalable particulate and nuisance dust exposure, these include the World Bank (WB), European

Union (EU), United Kingdom (UK), World Health Organisation (WHO), and the United States Environmental Protection Agency (USEPA).

6.9 NOISE

The main sources of noise in the area are from traffic on the main roads, Matimba Power Station, power station infrastructure remote from the facility (inclusive of the overland conveyor system and the activities at the ADF), Medupi Power Station (still under construction) and the Grootegeluk Coal Mine. These noise sources are significant contributors to a degraded noise climate.

The noise sensitive receptors include the existing residential areas, farm houses, farm labourer dwellings, schools, game farms and game lodges located around the study area.

6.10 VISUAL

Topographically the area around the Onverwacht / Matimba Power station area is relatively flat, and extending into the area to the north and west. These landscape characteristics mark a change from the area to the south of the town of Lephalale where much more hilly and incised topography, forming part of the Waterberg foothills, exists. The area in which the study area is located can thus be described as being very flat. Slopes on and around the site are very gentle and in some places almost imperceptible. The ground typically slopes very gently down to localised low points drained by ephemeral drainage lines.

The nature of the topography has implications for views: due to the relatively flat terrain the topography typically does not restrict views to the surroundings, in particular when the viewer is located on a localised elevated position. However, the flat nature of the terrain entails that micro-topographical features, in particular vegetation is highly effective in screening views from the viewer's location.

Vegetation cover is intrinsically related to land use; the natural vegetation of the area is woodland. The warm nature of the climate due to the latitudinal position of the site and generally sandy soils allows the climatic vegetation type to develop as tall, relatively enclosed woodland, with a mix of deciduous and evergreen trees. The average height of the vegetation in its mature, undisturbed state is approximately 2 m to 4 m, and as described below this can have an important effect on restricting views.

The land use around the study area is a mix of a number of components, including urban (commercial and residential), industrial, and livestock / game farming. The urban commercial and residential component is provided by the town of Lephalale and its 'satellite' Onverwacht. The wider area around the proposed development site displays a significant industrial component in the form of the Matimba Power Station complex, the Medupi Power Station (currently under construction), and the Grootegeluk Mine Complex which is currently expanding to the north and the west. In contrast to this developed component, the surrounds of the town (especially areas to the south-west, west and north) still contain areas in which livestock rearing and game farming occur. In these areas, the natural woodland has largely been retained. One does not have to move too far beyond the boundaries of the town to find areas that are non-industrial in character, rather being characterised by a rural or even natural visual environment. The presence of woodland vegetation that is highly effective in screening views from the viewer's location within these areas of natural vegetation also tends to contribute to this perception of a more natural setting.

The visual character of the study area is thus partly industrial and urban. The nature of the visual character affects the visual absorption capacity (VAC). The visual absorption capacity of an area / landscape refers to ability of that area / landscape to absorb development without noticeable intrusion or change to the visual character of the area. Visual absorption capacity can be measured on a scale from high (an area which has a high capacity to absorb new development) to low (an area in which a new development would be highly visible and would alter the visual character of the area). Visual absorption capacity is a function of a number of factors including topography (including slope and aspect) and the nature of land use and land cover (such as vegetation cover and height), and importantly the degree of human-induced transformation of the area.

Urbanised or industrial areas typically have a high visual absorption capacity in the context of the type of development that is proposed, especially where industrial-type structures already occur. Conversely highly natural or rural areas with a low human footprint would have a very low VAC for the development of an industrial component.

6.10.1 VISUAL RECEPTORS

In order to identify receptor locations potentially affected by the proposed development, areas of human habitation within 5 km of each of the two development sites were identified. 5 km was selected as a reasonable radius, as beyond this distance the degree of visual exposure associated with the proposed development is likely to be too small to generate a visual impact. In the identification of receptor locations, all residential areas were included, with properties on the margins of such settlements being most likely to be exposed to views towards the proposed development (due especially to the flat nature of the terrain). Within the parts of the radial areas around the site alternatives which are not urban or industrial areas, homesteads and farmsteads, as well as commercial and non-commercial accommodation facilities where present were identified as receptor locations. Areas of potential future development were also considered. The visual receptors near the proposed study area include:

- Manketti Lodge;
- Marapong Contractors Lodge;
- Eendracht Farmstead;
- Kuipersbult Farmstead; and
- Marapong Residential Area.

The PCDs and diversion trenches will be absorbed by the surroundings once operational as they are depressions.

6.11 TRAFFIC

6.11.1 ROADS

There key roads servicing the area include:

- Road D1675 is a surfaced road aligned in an east-west direction and linking Lephale to Steenbokpan. It links from Road P84/1 (Route R510) in Lephale to Road P16/2. The section of the road east of the intersection with Road D2001, namely the section through Onverwacht and Lephale, is named Nelson Mandela Drive.
 - Road D2001 is the main access to Matimba Power Station from Road D1675 (Nelson Mandela Drive). It is surfaced road on the section from its intersection with Road D1675 to Matimba Power Station and Grootegeluk Coal Mine. North of the coal mine it is a gravel road up to its intersection with Road P84/1 near the Stockpoort border post.
 - Road D2649 is a gravel road that links from D1675 just east of Medupi Power Station to Road P84/1 (Route R510) approximately 20 km south of Lephale.
-

6.11.2 RAIL

The only railway line in the area is aligned through the south-eastern sector of the site alternatives, linking from the Grootegeluk Coal Mine southwards to Thabazimbi. Its main use is the transport of coal from the coal mine. There are at present usually two trains per day.

6.12 SOCIAL

The study area falls in the Waterberg District Municipality (DC 36), and within the jurisdiction of the Lephale Local Municipality (LIM 362) of the Limpopo Province.

Lephale Local Municipality has the following demographic characteristics:

- The population is approximately 140,240 with a population growth rate of 3.76% per annum with a dependency ratio of 47.5%.
- 37% of residents of Lephale are female and 63% are male.

- The largest number of people fall within the age groups 20-24 and 25-29 years.
- Black African is by far the majority population group (90.9%), followed by White (7.9%), Coloured (0.9%) and Indian/Asian (0.3%).
- Approximately 6% of the population has no schooling, 27.9% with Matric and 12.3% with Higher education.
- The unemployment rate has decreased is approximately 23.4% as per 2011 census data.
- The average household size is 3.3 and the municipality has the highest number of households.
- 76.4% of people reside in formal dwellings, with 41.6% of housing owned while 33.7% are female headed households.
- Less than 50% of the households have access to basic services i.e. portable water, sanitation and refuse removal, however, 83.1% of the households have access to electricity for lighting.

Lephalale is defined by the Limpopo Growth and Development Strategy as a coal mining and petrochemical cluster. The area is currently experiencing growth driven by mining expansion and the construction of the Medupi Power Station. The local economy is dominated by the Grootegeluk coal mine (together with its beneficiation plants, is the biggest of its kind in the world) and the Matimba Power Station.

The three clusters that are most relevant to Lephalale are firstly coal and petrochemical, secondly red meat and thirdly, tourism.

Lephalale is also an important agricultural area, both in terms of animal and crop production. The main products produced are: cattle, game, vegetables, table grapes, citrus, cotton, tobacco, watermelon and paprika.

The Local Economic Development (LED) Strategy of Lephalale Municipality's Vision for 2025 is to:

- Increase power stations from one to five;
- Increase coal production from 16 million tons to more than 100 million tons per annum;
- Have a petrochemical industry established for 160 000 barrels per day;
- Diversify the local economy; and
- Double the population from 120 000 to 240 000.
- The following LED Interventions are recommended:
 - Promote the coal and petrochemical cluster;
 - Assist livestock farmers on communal land;
 - Increase tourism services and expenditure;
 - Support the informal economy; and
 - Improve service delivery by the municipality.

6.13 HERITAGE

The cultural landscape qualities of the larger region essentially consist of a single component, which is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) and a much later colonial (farmer) component.

As this is an environment that presents very little resources such as hills and outcrops for settling in, poor grazing and a lack of open water, the habitation of the region by humans has always been very low. It was only with the arrival of drilling rigs that below surface water could be accessed, that the population density increased.

6.13.1 PRE-COLONIAL PERIOD

Stone tools are known to occur in a low density on the banks of some of the rivers as well at the foot of outcrops and small hills. These mostly date to the Earlier Stone Age as well as to the Middle Stone Age and include typical points, blades and rectangular flakes. However, all these objects were found on the surface and are therefore out of their original context. As result, they are viewed to have low significance. Some rock art dating to the Later Stone Age occur in a number of shelters to the north-west of Lephalale.

Iron Age sites are only known to occur to the south, north and east of the general study area. These are linked to the Tswana and date in all probability to the period from 1600 and later.

On the koppie named Koorn Kop some interesting engravings of animal spoor, cupules and cut marks were identified on the southern face of the hill. In addition, on top of the hill a number of small stone walled sites occur. A few non-diagnostic stone flakes and potsherds occur in the shelter.

From ethnographic sources it is known that hills or promontories, for example in the Karoo, are important features to the San because they offer vantage points in an otherwise remarkably flat landscape from which the springbok may be watched. This is probably the purpose of the stone circles on top of Nelson's Kop, serving as lookout points. The fact that there is a big panel with a variety of engravings on it indicates that this is in all probability a site of potency, for the making of rain by the San and later Sotho-Tswana speaking people in the area.

6.13.2 COLONIAL HISTORY

The historic period starts of quite late in this part of the country. Probably one of the earliest published sources that refer to the area, in a generalised sense, is that of the explorer Thomas Baines who passed through the area during the early 1870s. Although for other sections of his travels he gives detailed descriptions of the local population, he does not comment on anybody in this particular area. Although his rendering of the various rivers and other topographical features are quite accurate for the time, he seems to imply that there were no communities settled here.

In the town of Lephalale (Ellisras) there is a cemetery containing the graves of some of the earliest white settlers in the area. The town of Ellisras was only laid out in December 1960, and was named after two of the pioneer families in the area, Ellis and Erasmus. In 2002, the name was changed to Lephalale. This latter name is taken from the Phalala River, which is derived from the Tswana verb 'to flow' or 'one which overflows'.

6.13.3 STUDY FINDINGS

The Heritage and Palaeontological study dated April 2014 only identified two potential heritage sites close to the proposed North PCD area, however, this was of low significance with no mitigation required. A small two roomed structure which is in a bad state of repair. The roof and all the fittings have been removed. Even some of the bricks have been taken out, possibly for recycling. This makes it difficult to date the site. Surrounding this structure are found broken bottles, metal cans, pieces of wire, etc. From this it is deduced that the structure served either as accommodation for a labourer overseeing the farm and/or as a store room for farming equipment.

The significance was graded low on a regional level (Grade III) and as this feature was accorded a low significance, it was recorded in full after inclusion in the report and no further mitigation action was required.

The following was found to be applicable in the desktop assessment conducted by Archaetnos in January 2022:

- A HIA had been done in 2014. The HIA included an area covering the three positions indicated above. This HIA forms part of the approved IEA of the ADF.
- Nothing of heritage importance was identified during this HIA. Only two sites, which was deemed of low significance was identified.
 - The first consisted of the ruin of a possible farm workers dwelling which was in a bad state of repair. This site lies about 450 m south-west of the North PCD.
 - The second is the remains of a small house. It lies approximately 9 km north of the North PCD.
- The study of Google Earth Images also did not indicate the presence of possible heritage features.
- Although limited, indications of disturbance are visible at the North PCD site.
- A large section of the South PCD site is disturbed.
- There are no buildings on any of these sites.
- It is believed to be low risk areas for the location of heritage sites.

Considering these factors, the chances of finding any heritage related features are believed to be slim, if any. The developer should however note that due to the nature of archaeological material, such sites, objects or features, as well as graves and burials may be uncovered during construction activities on site. In such a case work should cease immediately and an archaeologist should be contacted as a matter of urgency to assess such occurrences.

A recommendation was made that the development be exempted from doing a HIA.

6.14 PALAEOLOGY

The study area lies in the undifferentiated Permian and Triassic deposits, with very old rocks to the south and east of Lephalale. The study area is on the edge of the Ecca sediments or within the Ecca sediments with the Waterberg Group, Sandriviersberg and Mokalakwa formations, further south, however it is not clear from the literature where the boundary is. Imprints of fossil leaves from this area are mentioned by Johnson *et al.* but no references are given. The palynology has been studied by MacRae (1988) and correlated with that from the Pafuri Basin. The palaeontological sensitivity is indicated in **Figure 6-19** below.

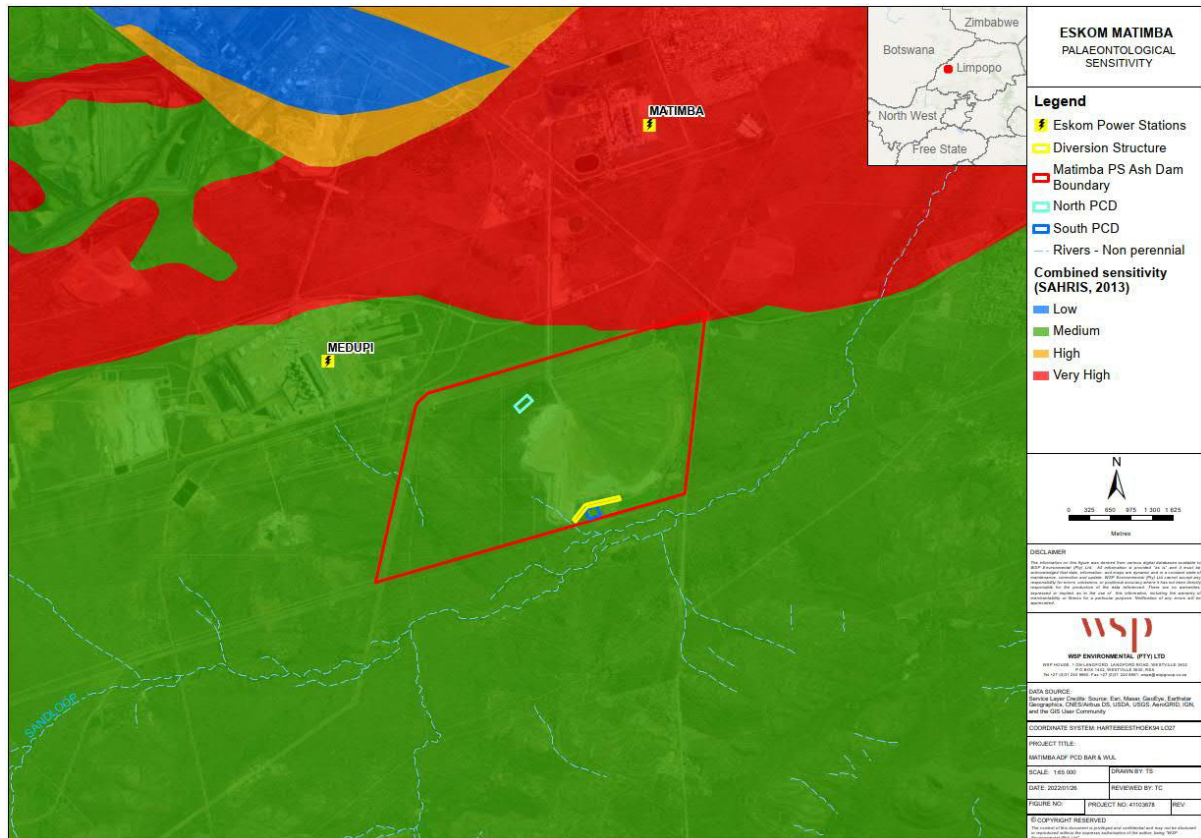


Figure 6-19: Palaeontological Sensitivity Map

The SAHRIS tool indicated that the proposed project falls within the green zone which indicates moderate paleontological sensitivity. No palaeontological findings were made in the previous Heritage and Palaeontological study dated April 2014 for both the North and South PCD footprints.

7 IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social effects associated with the proposed Project. The assessment methodology is outlined in **Section 3.5**. The issues identified stem from those aspects presented in **Chapter 6** of this document as well as project description provided. The impact assessment will be based on the preferred alternative at all project phases. This section only assesses the preferred option along with the no-go section. The mitigation hierarchy criteria for each mitigation measure is indicated in brackets after each measure indicated.

Furthermore, decommissioning assessment will be considered as part of the decommissioning process that will be subject to a separate authorisation and impact assessment process. Any decommissioning impacts will be assessed at this stage. The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326.

7.1 AIR QUALITY

7.1.1 CONSTRUCTION PHASE

DUST AND PARTICULATE MATTER

Air quality guidelines are provided by the ambient dust concentration limits prescribed by SANS 1929:2005. Whilst these guidelines are currently not enforceable they do serve as recommendations for good practice. SANS 1929:2005 sets out dust deposition rates, expressed in units of $\text{mg}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$ over a typical 30-day averaging period.

During the construction phase, dust and vehicular emissions will be released as a result of excavations as well as earth moving machinery and trucks transporting construction material. The emissions will, however, have short term impacts on the immediate surrounding areas that can be easily mitigated and thus the authorisation of such emissions will not be required. All construction phase air quality impacts will be minimised with the implementation of dust control measures contained within the EMPr (**Appendix G**) and the dust impacts will be short term in nature.

The impact of the construction phase on the generation of dust and PM is shown in **Table 7-1** below.

Table 7-1: Construction Impact on Generation of Dust and PM

Potential Impact: Generation of Dust and PM	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	2	3	1	4	32	Medium	(-)	High
With Mitigation	1	1	3	1	3	18	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and stockpiles. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated; – All stockpiles (if any) must be restricted to designated areas and of limited height; – Ensure that all vehicles and machines are adequately maintained to minimise emissions; – It is recommended that the clearing of vegetation from the site should be selective and done just before construction so as to minimise erosion and dust; 								

Potential Impact: Generation of Dust and PM	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence

7.1.2 OPERATIONAL PHASE

There are no anticipated air quality impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short term.

7.2 NOISE EMISSIONS

7.2.1 CONSTRUCTION PHASE

Elevated noise levels are likely to be generated by the construction activities (machinery and vehicles) and the workforce. It is important to note that noise impacts (nuisance factor) may vary in the different areas as a result of the surrounding land uses and will be temporary in nature. Due to the temporary and limited nature of the project activities, coupled with the fact that there are a limited number of noise receptors around the project area, the impacted is regarded as low. The construction impact on noise is indicated in **Table 7-2** below.

Table 7-2: Construction Impact on Noise

Potential Impact: Noise	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence	
Without Mitigation	2	1	3	1	4	28	Low	(-)	High
With Mitigation	2	1	1	1	3	15	Low	(-)	High
Mitigation and Management Measures									

7.2.2 OPERATIONAL PHASE

There are no anticipated noise impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short term.

7.3 SOIL EROSION AND CONTAMINATION

7.3.1 CONSTRUCTION PHASE

SOIL EROSION

During the construction phase, measures should be implemented to manage stormwater and water flow on the site. If the stormwater and water flow is not regulated and managed onsite, it could cause significant erosion of soil around the cleared areas.

During the construction phase, the project activities could leave soils exposed and susceptible to erosion. The construction impact on soil erosion is indicated in **Table 7-3** below.

Table 7-3: Construction Impact on Soil Erosion

Potential Impact: Soil Erosion	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence	
Without Mitigation	2	1	3	2	4	32	Medium	(-)	High
With Mitigation	1	1	3	2	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Implement stormwater management measures that will help to reduce the speed of the water. These measures must also assist with the prevention of water pollution, erosion and siltation; – Any exposed earth should be rehabilitated promptly, and this could include planting suitable vegetation (vigorous indigenous grasses) that mimics the surrounding environment to protect the exposed soil; – If excavations or foundations fill up with stormwater, these areas should immediately be drained and measures to prevent access to these areas should be implemented; – Erosion control measures should be implemented during the construction phase on large exposed areas and where stormwater is temporarily channelled; and – Rehabilitate the area to manage erosion. 								

SOIL CONTAMINATION

During construction activities, construction vehicles/trucks/machinery as well as hazardous substances stored on the site might spill and contaminate the soil. The impact of the construction phase on soil pollution is indicated in **Table 7-4** below.

Table 7-4: Construction Impact on Soil Contamination

Potential Impact: Soil Contamination	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	4	36	Medium	(-)	High
With Mitigation	1	1	3	2	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – All construction vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; – Plant and vehicles are to be repaired immediately upon developing leaks; – Drip trays shall be supplied for all idle vehicles and machinery; – No repair work may be undertaken on machinery onsite or campsite area; – Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; – Drip trays are to be inspected daily for leaks and effectiveness, and emptied when necessary. This is to be closely monitored during rain events to prevent overflow; – Ensure appropriate handling of hazardous substances; – Keep spill kits onsite and train personnel to use them appropriately; – Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and banded; and – Implement stormwater management measures that will help to reduce the speed of the water flows. These measures must also assist with the prevention of wider range of the site. 								

7.3.2 OPERATIONAL PHASE

SOIL EROSION

There are no anticipated soil erosion impacts expected during the operational phase as maintenance activities will occur as and when required and will be extremely short term, however, erosion and stormwater controls should be set up around the PCDs and diversion trench during construction to protect them during the operational phase.

SOIL CONTAMINATION

There are no anticipated soil contamination impacts expected during the operational phase as the area will be transformed to the final structures. Maintenance activities will occur as and when required and will be extremely short term.

7.4 SURFACE WATER

7.4.1 CONSTRUCTION PHASE

DETERIORATION IN WATER QUALITY

There is a potential to affect the surface water quality in the area due to construction activities. This is influenced by spills and leaks, the storage of chemicals, mixes and fuel, location and protection of stockpiles, onsite waste management and the management of stormwater. The impact of construction on deterioration in water quality is shown in **Table 7-5** below.

Table 7-5: Construction Impact on Deterioration in Water Quality

Potential Impact: Deterioration in Water Quality	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	4	36	Medium	(-)	High
With Mitigation	1	1	3	2	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – A spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers; – Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair; – Ensure that no activities are conducted outside any buffers delineated; – Construction areas should be demarcated and development limited to these boundaries; – Construction method statements are to be adhered to. These method statements should consider hydrological flow regimes, flora and fauna; – During construction, contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly; – A suitable stormwater management plan must be formulated for the project to control stormwater movement onsite; – The stormwater management plan should incorporate “soft” engineering measures as much as possible, limiting the use of artificial materials; – As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site; 								

Potential Impact: Deterioration in Water Quality	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	<ul style="list-style-type: none"> The dams must be incorporated into the site's emergency preparedness plan and cover the dam failure or overflow scenarios. 							

7.5 GROUNDWATER

7.5.1 CONSTRUCTION PHASE

DETERIORATION IN GROUNDWATER QUALITY

There is a potential to affect the groundwater quality in the area. This is influenced by spills and leaks, the storage of chemicals, mixes and fuel. Any contaminants that are not cleaned from the ground will seep into underground water resources. The impact of construction on change in water quality is shown in **Table 7-7** below.

Table 7-7: Construction Impact on Deterioration in Groundwater Quality

Potential Impact: Deterioration in Water Quality	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Without Mitigation	3	2	3	2	3	30 Medium	(-)	High
With Mitigation	2	2	3	2	2	18 Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> Construction areas should be demarcated, and areas outside of the footprint marked as "restricted" in order to prevent the unnecessary impact to and loss of these systems; Laydown yards, camps and storage areas must be beyond any water features where applicable; During construction, contractors used for the project must have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly; A suitable stormwater management plan must be formulated for the project to control the movement of water onsite; The stormwater management plan should incorporate "soft" engineering measures as much as possible, limiting the use of artificial materials; As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site; All chemicals and toxicants during construction and operation must be stored in bunded areas; All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site; All contractors and employees should undergo induction which is to include a component of environmental 							

	<p>awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”;</p> <ul style="list-style-type: none"> – Adequate sanitary facilities and ablutions on the project area must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation); and – Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems.
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7.5.2 OPERATIONAL PHASE

DETERIORATION IN WATER QUALITY

There is a potential to affect the groundwater quality in the area due to operational activities. This is influenced by potential dam failure or dam overflows. The impact of operation on deterioration in water quality is shown in **Table 7-6** below.

Table 7-8: Operational Impact on Deterioration in Groundwater Quality

Potential Impact: Deterioration in Water Quality	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	4	36	Medium	(-)	High
With Mitigation	1	1	3	2	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Level control measures that can be monitored from a control room must be in place at the PCDs to avoid overflows; – Pumping mechanisms must be in place to pump water from the PCDs to alternative PCDs on the site in the event of potential overflows or dam failure; and – Regular monitoring and maintenance must be done on the PCDs and the supporting infrastructure to prevent dam overflows and failure. – During construction, contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly; – The dams must be incorporated into the site’s emergency preparedness plan and cover the dam failure or overflow scenarios. 								

7.6 BIODIVERSITY

A detailed impact assessment was conducted as part of the initial study by Bathusi (2014) which covered a larger footprint, encompassing the ADF. The current study assessed possible site-specific impacts at both PCD sites based on the current status quo of the study area. Anticipated impacts that will be applicable to development activities at both sites, include at a minimum:

and the following impacts are anticipated during the construction and operational phase of the project.

- The loss of functional, undisturbed natural bushveld habitat;
- The loss of protected tree species;

- Potential establishment or further spread of alien invasive species; and
- Loss or injuring of fauna species
- Erosion.

An impact significance assessment was conducted for the two PCD sites, due to the habitat at the two sites being significantly different, with the South PCD highly impacted and North PCD almost natural.

7.6.1 CONSTRUCTION PHASE

LOSS OF THE REMAINING FUNCTIONAL, UNDISTURBED NATURAL BUSHVELD HABITAT

The construction phase involves the clearance of vegetation and earthwork activities which leads to loss of the remaining functional, undisturbed natural bushveld habitat. The construction impact on the impact is indicated in **Table 7-9** below.

Table 7-9: Construction Impact on Loss of the Remaining Functional, Undisturbed Natural Bushveld Habitat

Potential Impact: Loss of the remaining functional, undisturbed natural bushveld habitat	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	4	4	56	Medium	(-)	High
With Mitigation	2	1	1	2	3	18	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Vegetation clearing should be restricted to the proposed infrastructure footprints only, with no clearing permitted outside of this area. – As far as possible, the south PCD should be placed in areas classified as Mines and Industrial Areas (disturbed areas) – The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of this area 								

LOSS OF PROTECTED TREE SPECIES

The proposed vegetation clearing and earthwork activities will lead to the loss of protected tree species. The construction impact on the impact in the project area is shown in **Table 7-10** below.

Table 7-10: Construction Impact on Loss of Protected Tree Species

Potential Impact: Loss of Protected Tree Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	4	4	48	Medium	(-)	High
With Mitigation	2	2	1	2	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – No protected tree species should be disturbed without the necessary permit in place; – Removal of protected tree species must be done under the supervision of a qualified botanist and a permit should be obtained prior to the removal of protected tree species; and – Removed protected trees should be translocated to a nearby nursery or replanted in an area with similar environmental conditions. 								

LOSS OR INJURING OF FAUNA SPECIES

The vegetation clearance and earthwork activities will lead to the loss or injuring of fauna species. This also impacts potential threatened species. The nature of the impact is indicated in **Table 7-11** below.

Table 7-11: Construction Impact on Loss or Injuring of Fauna Species

Potential Impact: Loss or Injuring of Fauna Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	2	3	4	2	22	Low	(-)	High
With Mitigation	2	1	1	3	2	14	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – An ECO should be on-site during vegetation clearing to monitor and manage any wildlife-human interactions. The ECO should be trained in inter alia, species identification; – As appropriate, barrier should be erected to prevent fauna from gaining access to construction and operational areas where they have a high probability of being killed or injured; and – A low-speed limit (recommended 20-40 km/h) should be enforced for vehicles on site to reduce wildlife collisions. 								

POTENTIAL ESTABLISHMENT OR FURTHER SPREAD OF ALIEN INVASIVE SPECIES

Construction activities have the potential to lead to an increase in alien invasive species in the area. There is a potential for a spread and/or establishment of alien and/or invasive species, especially in areas that are cleared as it is brought to the project area via site personnel and trucks. These are brought by site personnel on their clothing or via the truck tyres or as a result of pioneer species following a construction activity. The construction impact on spread in alien invasive species in the area is shown in **Table 7-12** below.

Table 7-12: Construction Impact on Potential Establishment or Further Spread of Alien Invasive Species

Potential Impact: Potential Establishment or Further Spread of Alien Invasive Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	4	4	52	Medium	(-)	High
With Mitigation	2	1	1	3	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – An alien invasive species management strategy. This strategy must make reference to: <ul style="list-style-type: none"> – Uprooting, felling or cutting; – Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer; – A combined approach using both chemical and mechanical control methods; – Periodic follow-up treatments, informed by regular monitoring; and – Monitoring should take place in all disturbed areas, as well as adjacent undisturbed areas. 								

POTENTIAL EROSION OF SOILS

The vegetation clearing and earthwork activities lead to potential erosion of exposed soils. The construction impact on potential erosion of soils in the area is shown in **Table 7-13** below.

Table 7-13: Construction Impact on Potential Erosion of Soils

Potential Impact: Potential Erosion of Soils	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	4	4	48	Medium	(-)	High
With Mitigation	2	1	1	3	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Ensure proper surface restoration and resloping in order to prevent erosion, taking cognisance of local contours and landscaping; – Limit vegetation removal and soil disturbance to a minimum to reduce the potential of bare soil on site, particularly at south PCD; – Revegetate disturbed soils as far as possible to reduce the potential of surface runoff; and – Construct a berm at the perimeter of the PCD footprint to contain any possible spill or outflow from PCD, particularly the south PCD located in close proximity to a watercourse (drainage line). 								

7.6.2 OPERATIONAL PHASE

POTENTIAL ESTABLISHMENT OR FURTHER SPREAD OF ALIEN INVASIVE SPECIES

Operational activities have the potential to lead to an increase in alien invasive species in the area. There is a potential for a spread and/or establishment of alien and/or invasive species, due to ongoing site visits. The operational impact on spread of alien invasive species in the area is shown in **Table 7-14** below.

Table 7-14: Operational Impact on Potential Establishment or Further Spread of Alien Invasive Species

Potential Impact: Potential Establishment or Further Spread of Alien Invasive Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	4	4	52	Medium	(-)	High
With Mitigation	2	1	1	3	3	21	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – An alien invasive species management strategy. This strategy must make reference to: <ul style="list-style-type: none"> – Uprooting, felling or cutting; – Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer; – A combined approach using both chemical and mechanical control methods; – Periodic follow-up treatments, informed by regular monitoring; and – Monitoring should take place in all disturbed areas, as well as adjacent undisturbed areas. 								

7.7 TRAFFIC

7.7.1 CONSTRUCTION PHASE

The impact of additional traffic during construction is expected to be minimal and short term. The project area is within the ADF boundary with limited movement of vehicles. The regional road leading to the ADF will have traffic at key peak hours (early morning and at the end of each day). During the site visit, it was observed that there is limited movement of vehicles on this road outside of the peak hours which means the intermittent movement of trucks delivering construction supplies will have a low impact. The construction impact on traffic is indicated in **Table 7-15** below.

Table 7-15: Construction Impact on Increased Local Traffic

Potential Impact: Increased Local Traffic	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	1	4	28	Low	(-)	High
With Mitigation	2	1	1	1	3	15	Low	(-)	High

Mitigation and Management Measures	<ul style="list-style-type: none"> – Ensure deliveries are done as and when required and limit material deliveries to outside of peak hours; – Ensure the majority of the construction material is kept at the laydown area thus minimising the daily loads required; – The road network which surrounds the proposed development will have to be correctly maintained in order to support additional movement of vehicles. Transport should be limited to non-peak hours; and – All site vehicles must limit the idle time on the access road.
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7.7.2 OPERATION PHASE

There are no anticipated traffic impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short term.

7.8 HEALTH AND SAFETY

7.8.1 CONSTRUCTION PHASE

During construction, the employees are exposed to health and safety hazards from the mechanical machines and equipment used on the site. Furthermore, there is a potential for snakes in the area, to which the employees must be warned about and trained on how to handle situations if any encounters occur. The construction impact on health and safety is indicated in **Table 7-16** below.

Table 7-16: Construction Impact on Employee Health and Safety

Potential Impact: Employee Health and Safety	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence	
Without Mitigation	4	2	5	4	4	60	High	(-)	High
With Mitigation	3	2	3	4	3	36	Medium	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Eskom’s HSE officer will monitor safety conditions during construction activities; – Ensure employees are properly trained to use specific equipment or machinery; – Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area; – Provide suitable personal protective equipment (PPE); – Conduct site and safety induction to raise awareness of the risks associated with the site; – Conduct regular toolbox talks as refreshers to improve health and safety; – Develop safe work instruction method statements that should be used by employees in completing their tasks; – Train all relevant personnel on handling, use and storage of hazardous substances; 								

7.9 WASTE MANAGEMENT

7.9.1 CONSTRUCTION PHASE

LITTERING

The proposed development will potentially lead to littering by construction personnel through illegal disposal of waste. The negative impact of this phase is limited as it is temporary as well. The construction impact on littering is indicated in **Table 7-19** below.

Table 7-18: Construction Impact on Littering

Potential Impact: Littering	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	1	3	1	4	32	Medium	(-)	High
With Mitigation	2	1	1	1	3	15	Low	(-)	High
Mitigation and Management Measures	<ul style="list-style-type: none"> – Waste management must be a priority and all waste must be collected and stored adequately. The existing waste management plan should be implemented. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site; – Litter, spills, fuels, chemicals and human waste in and around the project area; – A minimum of one toilet must be provided per 10 persons. – The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility; – Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site; and – Refuse bins will be emptied and secured. Storage of domestic waste shall be in covered waste skips. 								

7.9.2 OPERATIONAL PHASE

No conceivable operational phase impacts are expected as Eskom already has a maintenance team will only be on site as and when required (intermittently) and for an extremely limited time. As such, the impacts are negligible.

7.10 SOCIO-ECONOMIC

7.10.1 CONSTRUCTION PHASE

EMPLOYMENT OPPORTUNITIES

The proposed development will create a limited number of employment opportunities for individuals in the surrounding area. The positive impact of this phase is limited as it is temporary as well. The construction impact on employment opportunities is indicated in **Table 7-19** below.

Table 7-19: Construction Impact on Employment Opportunities

Potential Impact: Employment Opportunities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	1	3	24	Low	(+)	High
With Mitigation	2	2	3	2	3	36	Medium	(+)	High
Mitigation and Management Measures	– The project must aim to use local labour in order to benefit the local community, where possible and applicable for the project.								

7.10.2 OPERATIONAL PHASE

No conceivable operational phase impacts are expected as Eskom already has a maintenance team in place for the proposed project. As such, there will be no opportunities for locals at that stage of the project.

7.11 HERITAGE

7.11.1 CONSTRUCTION PHASE

The Heritage and Palaeontological study dated April 2014 only identified two potential heritage sites close to the proposed North PCD area, however, this was of low significance with no mitigation required.

There are no anticipated heritage impacts during the construction phase as no findings were made in the Heritage study conducted, however, if findings are made during excavations and other intrusive construction activities, a chance find procedure will be implemented.

7.11.2 OPERATIONAL PHASE

There are no anticipated heritage impacts during the operational phase as any existing resources would have been discovered during excavations and other intrusive construction activities.

7.12 PALAEOLOGICAL

The SAHRIS tool indicated that the proposed project falls within the green zone which indicates moderate palaeontological sensitivity. No palaeontological findings were made in the previous Heritage and Palaeontological study dated April 2014. As such, there are no impacts expected with regards to palaeontological resources.

7.13 NO-GO ALTERNATIVE

The no-go alternative will mean none of the negative and positive impacts described above will come into effect.

7.14 CUMULATIVE IMPACT ASSESSMENT

The Medupi Power Station ADF and PCDs as well as the Grootegeluk Coal Mine PCDs are within 9km of the Matimba Power Station ADF and PCDs. The potential cumulative impact of PCDs is groundwater contamination, however, the Medupi ADF and PCDs as well as the Grootegeluk mine PCDs are lined, as such, there are no cumulative impacts anticipated or are expected to be negligible.

The screening tool identified renewable development projects (wind and solar) within this radius with the closest being 5km away. However, these do not require PCDs for an ADF. As such, no cumulative assessment has been considered.

8 ENVIRONMENTAL IMPACT ASSESSMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that “*development must be socially, environmentally and economically sustainable.... and requires the consideration of all relevant factors...*” NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA’s preventative principle, potentially negative impacts on the environment and on people’s environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of “reasonable measures”.

In assessing the environmental feasibility of the proposed construction of the PCDs and diversion trench, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience and the relevant legislation (where applicable).

The conclusions of this BA are the result of comprehensive assessments. These assessments were based on issues identified through the BA process and the parallel process of public participation that will be conducted when submitting for public review. The public consultation process will be undertaken according to the requirements of NEMA and every effort was made to include representatives of all stakeholders within the process.

8.1 ENVIRONMENTAL SENSITIVITIES

The following environmental sensitivities were identified on the site and will require specific applications or measures for mitigation to minimise impact. The proposed project site is located in the following sensitive environments:

- **Surface Water:**
 - There are no key surface water features identified for the North PCD footprint.
 - The South PCD footprint is located close to a tributary of the Sandloop River.
- **Biodiversity:**
 - The movement and dispersal of unmanaged free-roaming wildlife populations is therefore probably only moderately restricted. This is supported by the observation of large mammals on-site during the 2022 field visit, including Warthog (*Phacochoerus aethiopicus*), Chacma Baboon (*Papio ursinus*) and Impala (*Aepyceros melampus*). Undisturbed natural vegetation associated with both the proposed PCD site footprints is therefore considered to likely support fauna species of conservation concern such as the Tawny Eagle (*Aquila rapax*), Leopard (*Panthera pardus*) and Brown Hyaena (*Parahyaena brunnea*), identified in the Bathusi (2014) study.
 - The Screening Tool report identified a high sensitivity with regards to aquatic biodiversity as listed above, with a potential freshwater ecosystem priority area quaternary catchment. However, these were not identified during the desktop assessment and with no key features identified during the site visit in this respect.
- **South PCD Site:**
 - The project footprints are in a very high aquatic biodiversity and terrestrial biodiversity theme sensitivities as well as in a low plant species theme sensitivity.
 - The proposed South PCD footprint and large portions of the proposed diversion structure route are highly modified by past vegetation clearing and earth works associated with the operations of the Matimba ADF.

- Vegetation mostly comprises a secondary, sub-climax community of short, open bushveld. Woody vegetation is dominated by fine-leaved species, such as regenerating *Dichrostachys cinerea*, *Senegalia erubescens* and *Vachellia grandicornuta* trees, with some broad-leaf species (e.g., *Grewia flava*) present. The herbaceous layer is grass dominated, with several species locally abundant including *inter alia*; *Chloris virgata*, *Dactyloctenium aegyptium*, *Enneapogon cenchroides*, *Eragrostis trichophora*, *Tragus berteronianus* and *Urochloa mossambicensis*. The adjacent artificial water impoundment structure is characterised by species preferring moist soils condition such as *Cynodon dactylon*, *Echinochloa colona*, *Panicum* sp., *Typha capensis*, *Sporobolus* cf. *consimilis* and Cyperaceae species. Alien invasive species are also common across the site, with *Nicotiana glauca* and *Flaveria bidentis* particularly abundant. Both these species are listed as Category 1b invasive species, under the NEMBA.
- Portions of the proposed diversion structure route are also characterised by patches of relatively undisturbed natural habitat. These patches typically comprise short, closed thicket. Consistent with bottomland areas characterised by clayey soils, they are dominated by fine-leaved woody species, such as *Senegalia erubescens*, *Senegalia mellifera*, *Senegalia nigrescens*, *Vachellia grandicornuta*, *Vachellia tortilis* subsp. *Heteracantha* and *Dichrostachys cinerea*. Other woody species recorded include *Boscia albitrunca*, *Boscia foetida*, *Combretum apiculatum*, *Euclea undulata*, *Grewia flava*, *Grewia flavescens*, *Peltophorum africanum* and *Ziziphus 68fricana*⁶⁸. Commonly recorded grasses include *inter alia*; *Eragrostis trichophora*, *Panicum maximum* and *Urochloa mossambicensis*.
- Although not abundant, protected trees were recorded at this site, including *Boscia albitrunca* – which is listed as a nationally protected tree according to Schedule A of the National Forests Act (Act No. 84 of 1998), and *Spirostachys 68fricana* – which is listed as Protected according to the Limpopo Environmental Management Act (Act No. 7 of 2003).
- **North PCD Site:**
- The proposed North PCD site is characterised by undisturbed, natural bushveld that occurs on upland sandy to loam soils and is typical of the vegetation of the broader region. Vegetation structure is variable, and ranges from low, open woodland to relatively tall, closed woodland.
- In terms of composition, woody vegetation comprises a mixture of broad- and fine-leaved species. Common species in the upper woody stratum include *Sclerocarya birrea* subsp. *caffa*, *Senegalia burkei* and *Senegalia nigrescens*. In the lower and mid strata, several woody species are abundant, such as *Combretum apiculatum*, *Combretum zeyheri*, *Dichrostachys cinerea*, *Grewia bicolor*, *Grewia flava*, *Grewia flavescens*, *Grewia monticola* and *Terminalia sericea*.
- The herbaceous layer is well-developed and comprises a mixture of grasses and forbs. Common grasses include, *inter alia*; *Aristida congesta* subsp. *congesta*, *Digitaria eriantha*, *Eragrostis trichophora*, *Panicum maximum*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides* and *Urochloa mossambicensis*. Common forbs recorded include *inter alia*; *Abutilon forbesii*, *Commelina benghalensis*, *Hibiscus* species, *Melhania acuminata* and *Waltheria indica*.
- Protected trees recorded at this site include *Combretum imberbe*, *Sclerocarya birrea* subsp. *caffa*, and *Vachellia erioloba*. These are listed as nationally protected trees, according to the National Forests Act (Act No. 84 of 1998). One listed alien invasive species, *viz. Cereus jamacaru* (NEMBA Category 1b), was recorded at this site.
- **Heritage:**
- The project footprints are in a low archaeological and cultural heritage theme sensitivity. The 2022 desktop study indicates that it is highly unlikely that any heritage related features are to be found with an exemption for HIA recommended.

The proposed project sensitivities are shown in **Figure 8-1** below.

- *Melhania forbesii* Woodland Variation, but shares a number of the flora species documented in the broader *Kyphocarpa angustifolia – Eragrostis rigidior* Woodland Community by Bathusi (2014);
- The proposed North PCD footprint comprises undisturbed bushveld habitat that is aligned with the *Acacia nigrescens – Melhania forbesii* Woodland Variation, as described by Bathusi (2014);
- The entire footprint of the proposed North PCD site, and unmodified patches of the proposed South PCD site, comprise important habitat for fauna;
- In line with the findings of Bathusi (2014), the proposed North PCD site, and unmodified patches of the proposed South PCD site are considered to have medium-high floristic sensitivity and medium-high faunal sensitivity, and they should be managed according to these sensitivity ratings;
- Modified habitat at the proposed South PCD site does not constitute important natural habitat. These areas are rated as having medium-low floristic sensitivity and low faunal sensitivity, which is consistent with Bathusi’s (2014) rating for Artificial Woodland Habitat.

The existing biodiversity baseline developed by Bathusi (2014) remains relevant to the proposed PCD project and can be used during the development of the two PCD. However, it should be used in conjunction with the descriptions presented in Section 5.0 of the 2022 Biodiversity Technical Memorandum, which provide supplementary floristic information that is more specific to the proposed PCD development footprints.

8.2.3 HERITAGE ASSESSMENT

It is my opinion that the project may be exempted from doing a HIA, although the proposed locations are seemingly undisturbed and densely vegetated. The following is applicable:

- A HIA had been done in 2014. The HIA included an area covering the three positions indicated above. This HIA forms part of the approved IEA of the ADF.
- Nothing of heritage importance was identified during this HIA. Only two sites, which was deemed of low significance was identified.
 - The first consisted of the ruin of a possible farm workers dwelling which was in a bad state of repair. This site lies about 450 m south-west of the North PCD.
 - The second is the remains of a small house. It lies approximately 9 km north of the North PCD.
- The study of Google Earth Images also did not indicate the presence of possible heritage features.
- Although limited, indications of disturbance are visible at the North PCD site.
- A large section of the South PCD site is disturbed.
- There are no buildings on any of these sites.
- It is believed to be low risk areas for the location of heritage sites.

A recommendation was made that the development be exempted from doing a HIA.

8.3 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed project is provided in **Table 8-1** below.

Table 8-1: Impact Summary

NO.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
C1	Generation of Dust and PM	Construction	Medium	(-)	Low	(-)
C2	Noise	Construction	Low	(-)	Low	(-)

NO.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
C3	Soil Erosion	Construction	Medium	(-)	Low	(-)
C4	Soil Contamination	Construction	Medium	(-)	Low	(-)
C5	Deterioration in Water Quality (Surface Water)	Construction	Medium	(-)	Low	(-)
C6	Deterioration in Water Quality (Groundwater)	Construction	Medium	(-)	Low	(-)
C7	Loss of the Remaining Functional, Undisturbed Natural Bushveld Habitat	Construction	Medium	(-)	Low	(-)
C8	Loss of Protected Tree Species	Construction	Medium	(-)	Low	(-)
C9	Loss or Injuring of Fauna Species	Construction	Low	(-)	Low	(-)
C10	Potential Establishment or Further Spread of Alien Invasive Species	Construction	Medium	(-)	Low	(-)
C11	Potential Erosion of Soils	Construction	Medium	(-)	Low	(-)
C12	Increase in Local Traffic	Construction	Low	(-)	Low	(-)
C13	Employee Health and Safety	Construction	High	(-)	Medium	(-)
C14	Waste Management (Littering)	Construction	Medium	(-)	Low	(-)
C15	Employment Opportunities	Construction	Low	(+)	Medium	(+)
O1	Deterioration in Water Quality (Surface Water)	Operation	Medium	(-)	Low	(-)

NO.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
O2	Deterioration in Water Quality (Groundwater)	Operation	Medium	(-)	Low	(-)
O3	Potential Establishment or Further Spread of Alien Invasive Species	Construction	Medium	(-)	Low	(-)
O4	Employee Health and Safety	Operation	Medium	(-)	Low	(-)

8.4 IMPACT STATEMENT

The overall objective of the BA is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the EMPr) is sufficient for the DFFE to make an informed decision for the environmental authorisation being applied for in respect of this project.

Mitigation measures have been developed, where applicable, for the above aspects and are presented within the EMPr (**Appendix G**). It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be low. It is thus the opinion of the EAP that the project can proceed, and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

9 CONCLUSION

Eskom proposes to construct a construct a two PCDs and a diversion trench at the Matimba Power Station ADF.

This report provides a description of the proposed project and details the aspects associated with the construction and operation. The report also includes the methodology followed to undertake the BA process. A detailed description on the existing environment (bio-physical as well as socio-economic) is provided based on findings from the specialist surveys and existing information. Stakeholder engagement was undertaken from the onset of the project in a transparent and comprehensive manner. Outcomes of all comments received from the public review period will be recorded and responded to in the Final BAR. Based on the environmental description, specialist surveys as well as the stakeholder engagement, a detailed impact assessment was undertaken and, where relevant, the necessary management measures have been recommended.

In summary, the BA process assessed both biophysical and socio-economic environments and identified appropriate management and mitigation measures. The biophysical impact assessment revealed that there are no moderate or major environmental fatal flaws and no significant negative impacts associated with the proposed project should mitigation and management measures be implemented. In addition, it should be noted that the socio-economic impacts associated with the project are positive but limited.

The Draft BAR was made available for public review from **3 March 2022** to **4 April 2022**. All issues and comments submitted to WSP have been incorporated in the SER which will is attached to this Final BAR as **Appendix E6**.

The Final BAR has also been submitted to the competent authorities. It is the opinion of WSP that the information contained in this document is sufficient for the DFFE to make an informed decision for the EA being applied for in respect of this project.

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APPENDIX

A EAP AND SPECIALIST CV



APPENDIX

A-1 *ASHLEA STRONG*

APPENDIX

A-2 TUTAYI CHIFADZA

APPENDIX

A-3 *LUFUNO*

NEMAKHAVHANI

APPENDIX

A-4 LEE BOYD

APPENDIX

A-5 *ANTON VAN VOLLENHOVEN*

APPENDIX

B EAP AND SPECIALIST DECLARATIONS

APPENDIX

B-1 *ASHLEA STRONG*

APPENDIX

B-2 LUFUNO

NEMAKHAVHANI

APPENDIX

B-3 *LEE BOYD*

APPENDIX

B-4 ANTON VAN VOLLENHOVEN

APPENDIX

C STAKEHOLDER DATABASE



APPENDIX

D MAPS



APPENDIX

D-1 LOCALITY MAP

APPENDIX

D-2 LAYOUT MAP

APPENDIX

D-3 ENVIRONMENTAL SENSITIVITY MAP

APPENDIX

E PUBLIC PARTICIPATION



APPENDIX

E-1 ADVERT

Proof of advert publication will be provided in Final BAR

APPENDIX

E-2 SITE NOTICE

Proof of placement of site notices will be provided in Final BAR

APPENDIX

E-3 *EMAIL* *NOTIFICATIONS*

Proof of email notifications will be provided in Final BAR

APPENDIX

E-4 *SMS NOTIFICATIONS*

Proof of SMS notifications will be provided in Final BAR

APPENDIX

***E-5 APPROVED PUBLIC
PARTICIPATION PLAN***

APPENDIX

***E-6** STAKEHOLDER ENGAGEMENT REPORT*

Stakeholder Engagement Report will be provided in Final BAR followed the comment period.

APPENDIX

F SPECIALIST STUDIES



APPENDIX

F-1 2022 BIODIVERSITY IMPACT ASSESSMENT MEMO & 2014 IMPACT ASSESSMENT

APPENDIX

F-2 2022 SURFACE WATER ASSESSMENT MEMO & 2014 IMPACT ASSESSMENT

APPENDIX

F-3 2022 HERITAGE IMPACT ASSESSMENT EXEMPTION LETTER & 2014 IMPACT ASSESSMENT

APPENDIX

G EMPR

