
DRAFT BASIC ASSESSMENT REPORT: PROPOSED DEVELOPMENT OF A 20MVA 132KV/88KV ELECTRICITY SUBSTATION, TO BE KNOWN AS LESLIE-MATSHEKETSHENI SUBSTATION, ON A PORTION OF THE REMAINING EXTENT OF THE FARM BUHLE-BOMZINYATHI A17494-HT IN JAKKALSPAN, NEWCASTLE, KWAZULU-NATAL PROVINCE

DFFE REF NO.14/12/16/3/3/1/2501



APRIL 11

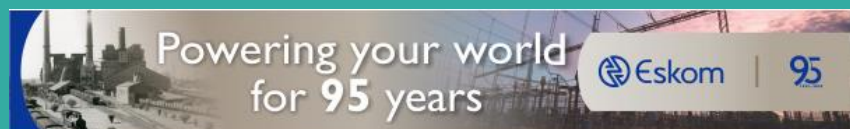
Consultant:

**Interdesign Landscape Architects
& Environmental Consultants**

Applicant:

**Eskom Holdings SOC Limited
Distribution, KZN Operating Unit**

601B Boerboel Ave, Garsfontein x 10, 0081
P.O. Box 74648, Lynnwood Ridge, Pretoria, 0040
t: +27 12 348 1922
f: +27 12 348 7154
e: info@ilaweb.co.za
www.ilaweb.co.za



DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED DEVELOPMENT OF A 20MVA 132KV/88KV ELECTRICITY SUBSTATION, TO BE KNOWN AS LESLIE-MATSHKETSHENI SUBSTATION, ON A PORTION OF THE REMAINING EXTENT OF THE FARM BUHLE-BOMZINYATHI A17494-HT IN JAKKALSPAN, NEWCASTLE, KWAZULU-NATAL PROVINCE

April 2022

Compiled by:

Mr. Mazolo Dube (Registered Environmental Assessment Practitioner: Number 2019/1692)

Reviewed by:

Mrs Shalini Chetty (Quality Assurance)

Interdesign Landscape Architects (ILA) promotes the general objectives of integrated environmental laid out under Section 23(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and therefore strictly adheres to relevant legislative requirements. In order to ensure best practices and ethics in the assessment of potential environmental impacts, ILA follows the prescribed national, provincial, and municipal environmental regulations and guidelines, where applicable.

Interdesign Landscape Architects does not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014, as amended.

DOCUMENT HISTORY

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April 2022	1.0	Draft

EXECUTIVE SUMMARY

Eskom Holdings SOC Limited proposes to develop a 20MVA 132kV/88kV Electricity Substation on a Portion of the Remaining Extent of the Farm Buhle-Bomzinyathi A17494-HT in Jakkalspan, Newcastle, KwaZulu-Natal Province. The subject farm portion is located east of Newcastle along the Madadeni Road to Utrecht, within the jurisdiction of the Amajuba District Municipality and Newcastle Local Municipality.

The proposed substation development, to be known as Leslie-Matshketsheni Substation, includes the installation of:

- two by 300m 132kV power lines, loop-in/loop-out circuit out of the existing Parklands-Vlaklaagte 132kV power line;
- two by incoming 132kV feeder bays with isolators only;
- one by transformer bay;
- one by 20MVA transformer;
- one by 132kV Busbar supported by beams and columns and strung with centipede;
- one by 11kV Busbar with A-frame structures strung with centipede; and
- 8 by 11kV feeders fully equipped.

It also includes the construction of a new access road, new control room, and steel palisade fence. The total development footprint of the substation is approximately 10 000m²/ 1 Ha in extent. Construction of the proposed substation will enable de-loading of the substations at Vlaklaagte and Blaauwbosch which are presently experiencing voltage regulation problems due to increased demands and thereby improve the quality of electricity supply in the greater Newcastle area. The need for the substation stems from the need to provide stronger voltage into the local network that currently experiences capacity constraints leading to outages and poor power supply. This will also lead to system failure and damage to electricity equipment.

The same proposed substation development was originally granted environmental authorisation by the then Department of Environmental Affairs (now DFFE) in 2016, but the validity of the authorisation lapsed prior to the commencement of the development. As a result, Eskom is required to re-submit a new application for environmental authorisation in terms of the EIA Regulations, 2014 (as amended).

Interdesign Landscape Architects (Pty) Ltd, as independent environmental consultants, was appointed by Eskom to conduct the new application process for environmental authorisation. This draft Basic Assessment Report is part of the application process and contains all the information listed in Appendix 1 of the EIA Regulations, 2014 (as amended) necessary for the Department of Forestry, Fisheries, and the Environment (DFFE) to make an informed decision on the application as the Competent Authority.

Two alternative sites for the proposed substation development were selected and assessed for potential environmental impacts. Both sites are described as transformed and degraded due to current and historical anthropogenic activities. However, the preferred site is situated within 500m of a wetland. The wetland is already degraded and under threat from further degradation due to the rapid spread of settlements in the area. The alternative site is severely transformed and in close proximity to existing houses compared to the preferred site option. The environmental assessment results in this report indicate the proposed development of the substation on the preferred site will have direct and indirect adverse cumulative impacts on the hydrological and ecological functioning of the wetland particularly during the construction phase. Although most of the significant impacts are temporal and localised, the alternative site has the least environmental impacts and therefore the most favourable option from an environmental perspective. An evaluation of the impact assessment results confirms there are no potential environmental fatal flaws associated with the proposed development of the substation on the preferred site, and all the potential adverse impacts can be effectively mitigated provided all the mitigation measures recommended in this report are implemented.

In addition, two alternative alignments for the proposed 300m 132kV power lines loop-in/loop-out circuit were identified and assessed for potential environmental impacts. Both the preferred and alternative alignments traverse through the wetland buffer. The preferred alignment follows almost a straight path heading north to connects to the existing Parklands-Vlaklaagte132kV power line situated in the wetland buffer. The alternative alignment avoids the existing houses to the northeast and makes a bend to connect to the substation. The proposed connection point for the alternative alignment from the existing Parklands-Vlaklaagte132kV power line is much closer to the wetland compared to the preferred alignment. The stringing of the power lines through the wetland buffer will have direct cumulative adverse impacts on the hydrological and ecological functioning of the wetland particularly due to the movement of construction vehicles and associated machinery. However, these adverse impacts are limited to the construction phase and are therefore temporal and local. An evaluation of the impact assessment results confirms there no potential environmental fatal flaws associated with the proposed installation and construction of the power lines provided all the mitigation measures recommended in this report are implemented.

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ABBREVIATIONS/ACRONYMS

BAR	Basic Assessment Report
CA	Competent Authority
DFFE	Department of Forestry, Fisheries, and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EMPr	Environmental Management Programme
ESKOM	Eskom Holdings SOC Limited
I&AP	Interested and Affected Party
ILA	Interdesign Landscape Architects
KV	Kilovolts
KZN	Kwazulu- Natal Province
KZN-EDTEA	Kwazulu-Natal Department of Economic Development, Tourism and Environmental Affairs
KZN-ARI	KwaZulu-Natal Amafa and Research Institute (The Institute)
MDM	Majuba District Municipality
MVA	Mega Volt Ampere
NEMA	National Environmental Management Act 1998 (Act No.107 of 1998)
NLM	Newcastle Local Municipality

APPENDICES

Appendix A – EAP’s CVs	<i>Appendix A1: Project Leader’s CV</i>
	<i>Appendix A2: Environmental Manager’s CV</i>
Appendix B – Locality & Environmental Spatial Maps	<i>Appendix B1: Locality Map</i>
	<i>Appendix B2: Alternative sites Locality</i>
	<i>Appendix B3: KZN Biodiversity Sector Plan – Terrestrial Biodiversity Map</i>
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	<i>Appendix B5: KZN Biodiversity Sector Plan – National Wetlands NFEPA LAYER</i>
Appendix C – Site Plan & Designs	<i>Appendix C1: Site Plan</i>
	<i>Appendix C2: Oil Holding Dam Design</i>
	<i>Appendix C3: Drainage Plan</i>
Appendix D – DFFE Environmental Screening Report	
Appendix E – Specialist Reports	<i>Appendix E1: Ecological Report</i>
	<i>Appendix E2: Heritage Impact Assessment Report</i>
Appendix F – Public Participation Information	<i>Appendix F1: Copies of the newspaper adverts</i>
	<i>Appendix F2: Copies of the Site Notices</i>
	<i>Appendix F3: Copies of the BIDs</i>
	<i>Appendix F4: Proof of the email notifications</i>
	<i>Appendix F5: Updated I&APs database</i>
	<i>Appendix F6: Copy of the notification letter for the draft BAR</i>
	<i>Appendix F7: Comments & Responses Report</i>
Appendix G – Environmental Management Programme (EMPr)	
Appendix H - Copy of existing Environmental Authorisation	

STRUCTURE OF REPORT

This report was prepared in terms of Regulation 19 of the EIA Regulations, 2014 (as amended), and contains all the required information as set out in Appendix 1 of the Regulations. The report is structured according to these requirements as indicated in Table 1 below.

Requirement as described in Appendix 1 of the Regulations	Relevant section in the report
(a) details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Section 1
the location of the activity, including: (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 2
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is— (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 3
(d) a description of the scope of the proposed activity, including— (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure;	Sections 3 & 4
(e) a description of the policy and legislative context within which the development is proposed including— (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 4
(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 5
(g) a motivation for the preferred site, activity and technology alternative;	Section 10
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including — (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— a) can be reversed;	Sections 3, 6, 7, and 8

<ul style="list-style-type: none"> b) may cause irreplaceable loss of resources; and c) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity; 	
<ul style="list-style-type: none"> (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, including— <ul style="list-style-type: none"> (xii) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (xiii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures; 	<p>Section 8</p>
<ul style="list-style-type: none"> (j) an assessment of each identified potentially significant impact and risk, including— <ul style="list-style-type: none"> (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of (vii) resources; and (viii) the degree to which the impact and risk can be avoided, managed or mitigated; 	<p>Subsection 8.2</p>
<ul style="list-style-type: none"> (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; 	<p>Sections 10 & 11</p>
<ul style="list-style-type: none"> (l) an environmental impact statement which contains— <ul style="list-style-type: none"> (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; 	<p>Section 10</p>
<ul style="list-style-type: none"> (m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact 	<p>Subsection 8.2</p>

management outcomes for the development for inclusion in the EMPr;	
(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;	Section 11
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 9
(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 10
(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 concluded, and the post construction monitoring requirements finalised;	Proposed development includes operational aspects
(r) an undertaking under oath or affirmation by the EAP in relation to— (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Declaration attached separately
(s) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not Applicable
(t) any specific information that may be required by the competent authority;	None
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	None
(2) Where a government <i>notice gazetted</i> by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	Not Applicable

SECTION 1: PROJECT DETAILS

PROJECT TITLE:	PROPOSED DEVELOPMENT OF A 20MVA 132KV/88KV ELECTRICITY SUBSTATION, TO BE KNOWN AS LESLIE-MATSHEKETSHENI SUBSTATION, ON A PORTION OF THE REMAINING EXTENT OF THE FARM BUHLE-BOMZINYATHI A17494-HT IN JAKKALSPAN, NEWCASTLE, KWAZULU-NATAL PROVINCE	
ENVIRONMENTAL ASSESSMENT PRACTITIONER:	<p>Interdesign Landscape Architects</p> <p>P.O Box 74648 Lynnwood Ridge 0040 Tel: 012 348 1922 E-mail: mazolo@ilaweb.co.za</p>	<p>Mrs Shalini Chetty (Environmental Manager and Reviewer) BA Environment and Development <i>IA/Asa 2376</i> Mrs Chetty has 13 years in Environmental Planning and Management including Environmental Impact Assessments, Basic Assessments, Environmental Management Programmes, Section 24G applications, Public Participation and Environmental Monitoring and Compliance, Visual Impact Assessments, and Environmental Due Diligence Studies.</p> <p>Refer to Appendix A for the Environmental Manager's CV.</p> <p>Mr Mazolo Dube (Project Leader & Report Writer) BSc Hnrs Environmental Management <i>Registered as a professional EAP with EAPASA (Reg No. 2019/1692)</i> <i>Registered as a Professional Natural Scientist with SACNASP (Reg. No.115799)</i> Mr. Dube has 10 years' experience in Environmental Planning and Management including Waste management plans and licences, Environmental Impact Assessments, Basic Assessments, Environmental Management Programmes, Section 24G applications, Public Participation, Environmental Monitoring and Compliance and Environmental Due Diligence Studies.</p> <p>Refer to Appendix A for the Project Leader's CV.</p>
APPLICANT:	Eskom Holdings SOC Limited	<p>Mr Sifiso N. Ntombela Environmental Management Officer Land Development Distribution, KZN Operating Unit 25 Valley View Road New Germany 3610 P. O. Box 66 New Germany 3610 Tel +27 31 710 5791 E-mail: NtombeSN@eskom.co.za</p>

SECTION 2: INTRODUCTION AND LOCATION

2.1 Introduction

Interdesign Landscape Architects (Pty) Ltd was appointed by Eskom Holdings SOC Limited to apply for an environmental authorisation for the proposed development of a 20MVA 132KV/88KV electricity substation and associated equipment on the Remainder of the Farm Buhle-Bomzinyathi A17494-HT in Jakkalspan, Newcastle, KwaZulu-Natal Province.

The proposed development was granted Environmental Authorisation (DEA Ref:14/12/16/3/3/1/1068) by the then Department of Environmental Affairs (DEA) in 2016 (refer to **Appendix H**). The Environmental Authorisation had a validity period of 5 years and subsequently lapsed in August 2021 prior to the commencement of construction activities. At the time of the expiry, no extension of the validity had been applied for. As such, a new application is being submitted to the now Department of Forestry, Fisheries, and the Environment (DFFE).

2.2 Locality

The Remainder of the Farm Buhle-Bomzinyathi A17494-HT, hereafter referred to as the development site, is located east of Newcastle along the road D1334 to Isikhahisezwe High School in Jakkalspan (**Figure 1 or Appendix B**). Access to the development site is approximately 440m off the road D1334 from Madadeni Road. The 21-digit Surveyor General code for the Farm is N0HT00000001749400000.

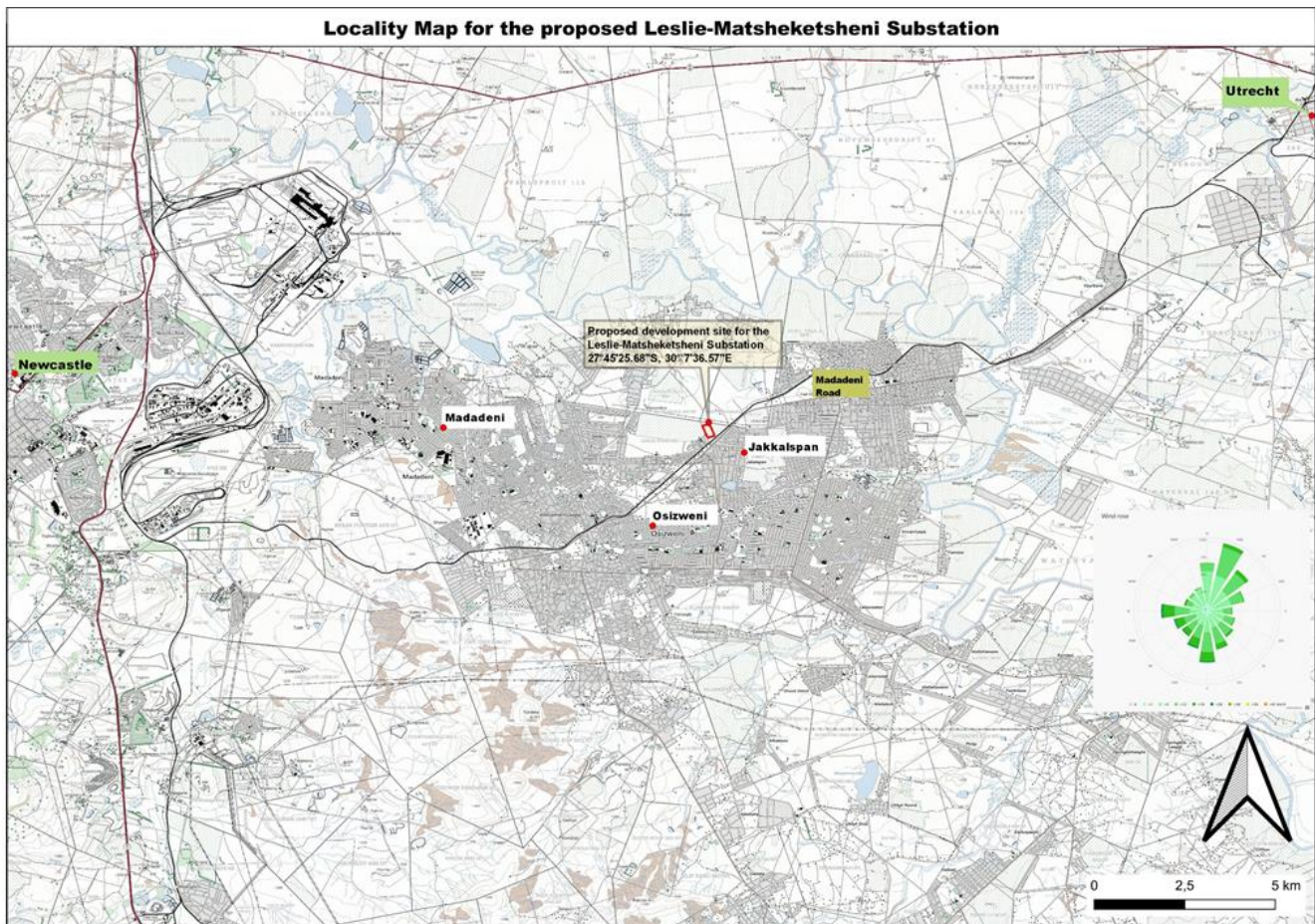


Figure 1: Locality Map of the proposed development site (27°45'25.68"S, 30° 7'36.57"E)

2.3 Surrounding Land-uses

The development site is predominantly in a semi urban- rural township characterised by urban residential developments with subsistence livestock farming. Most of the land in the study area including the development site was historically cultivated with some surrounding north western portions still actively cultivated. The development site is surrounded by the following land-uses: vacant agricultural land to the north; residential houses to the east, west, and south; Sizanani secondary School further west; and a railway line and major road (P483-Madadeni Road) to the south east. The development site is surrounded by the following residential townships:

- ✚ Jobstown and claremont - to the northeast and east respectively;
- ✚ Leslie - to the west;
- ✚ Muiskraall and Masondale - to the north west;
- ✚ Suspence – to the north; and
- ✚ Osizweni - to the south.

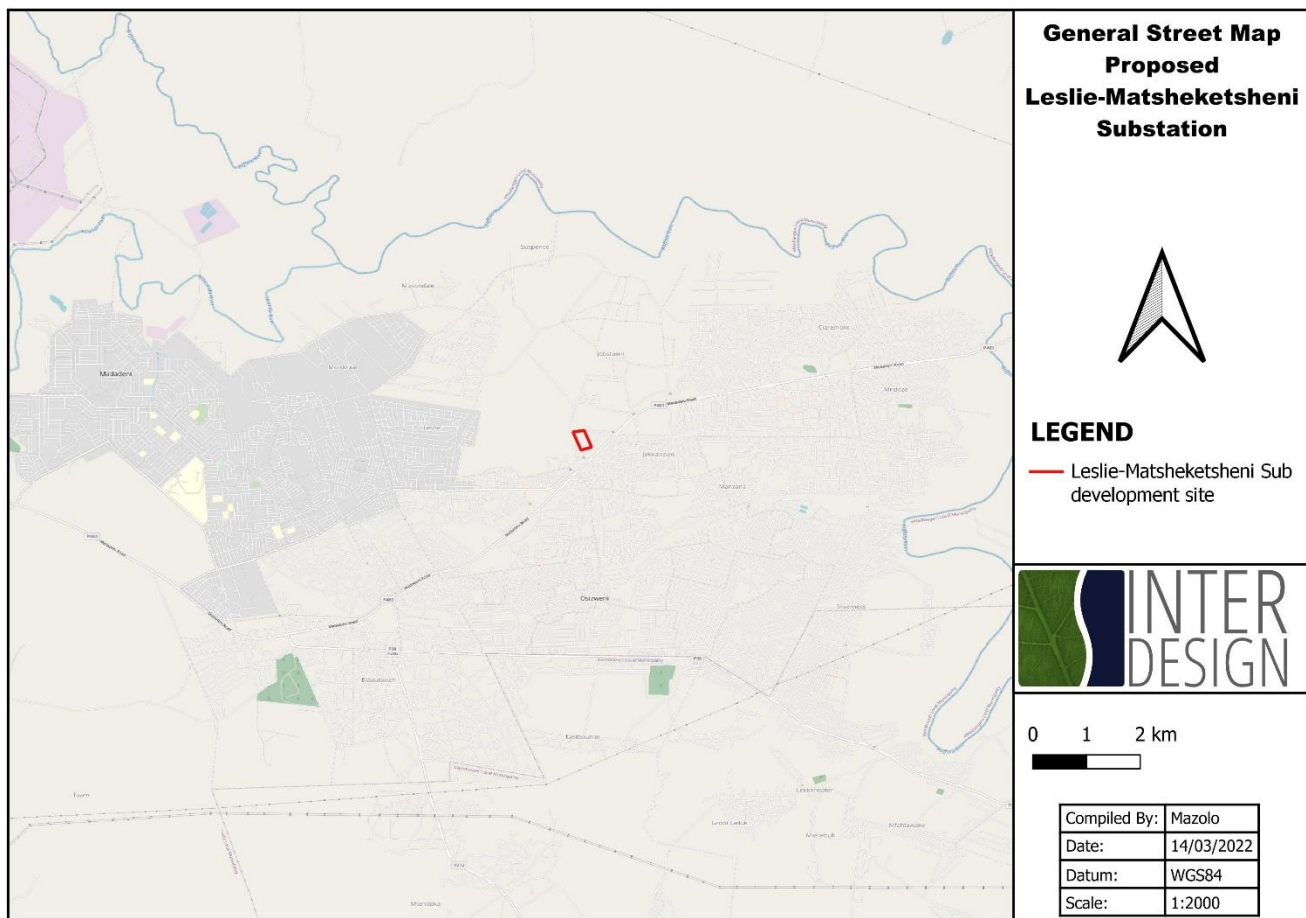


Figure 2: Street Map of the proposed development indicating the surrounding townships

The open space area from the west to northeast of the development site is mainly used for the cultivation of hay grass as livestock feed.

SECTION 3: PROPOSED ACTIVITY AND ALTERNATIVES

3.1 Proposed development

The Applicant, Eskom Holdings SOC Ltd, proposes to develop a 20MVA 132kV/88kV Electricity Substation on the subject farm portion. The proposed substation development, to be known as Leslie-Matshekesheni Substation, includes the installation of:

- two by 300m 132kV power lines, loop-in/loop-out circuit out of the existing Parklands-Vlaklaagte132kV power line;
- two by incoming 132kV feeder bays with isolators only;
- one by transformer bay;
- one by 20MVA transformer;
- one by 132kV Busbar supported by beams and columns and strung with centipede; one by 11kV Busbar with A-frame structures strung with centipede; and
- 8 by11kV feeders fully equipped.

It also includes the construction of a new access road, new control room, and steel palisade fence. The total development footprint of the substation is approximately 10 000m²/ 1 Ha. Refer to the site plan attached as **Appendix C1**.

The main purpose of the development is to strengthen the existing Parklands-Vlaklaagte132kV electricity grid in order to meet the growing demand for electricity supply in Nelspruit.

3.2 Alternatives

Alternatives are defined in the EIA Regulations, 2014 (as amended) as different means, in relation to a proposed activity, of meeting the general purpose and requirements of the activity, which may include alternatives to the—

(a) property on which or location where the activity is proposed to be undertaken;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity; or

(e) operational aspects of the activity;

and includes the option of not implementing the activity (no-go alternative).

The following process was followed in determining alternatives for the proposed development:

1. Consultations with the Eskom project team;
2. Initial public consultations;
3. Evaluation of the environmental baseline conditions of the site through desktop analyses and site visits; and
4. Need and desirability assessment.

It was concluded, based on the results of the above processes, the most reasonable and feasible alternatives that need to be investigated and assessed as part of this basic assessment process is the development site for the proposed substation and alternative routes for the 132Kv loop-in and loop-out powerline.

3.2.1 Alternative sites for the substation

Initially, a total of four (4) alternative sites were identified, but only two (2) were selected following a technical process (see **Figure 3 & 4** below). A baseline environmental screening process was then conducted for the two (2) selected alternative sites. Except for a wetland identified on the north eastern boundary of the first site (SS1), no any other environmentally sensitive features were identified on both alternative sites. The identification of the alternative sites was influenced by location of suitable connecting powerline, accessibility of connecting powerlines, availability and suitability of the site to locate the turn-in lines and substation, approval from land

users and landowners, and level of sensitivity of the receiving environment. Site visits were conducted as part of the baseline environmental screening process in order to verify the findings of a desktop analysis.

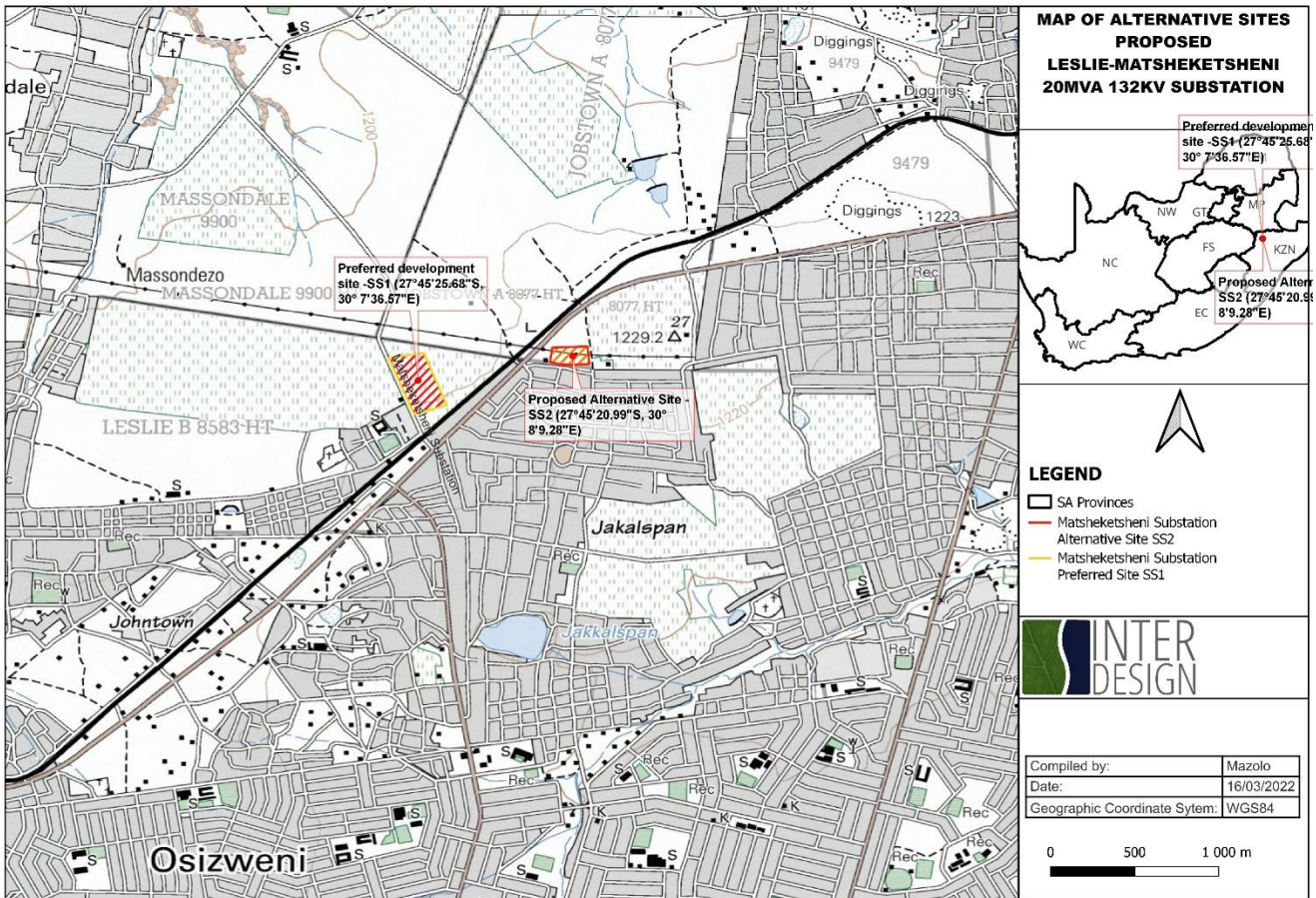


Figure 3: Preferred (SS1-27°45'25.68"S, 30° 7'36.57"E) and alternative (SS2-27°45'20.99"S, 30° 8'9.28"E) development site for the Substation – (refer to **Appendix B**)



Figure 4: A Google Earth satellite map of the preferred and alternative development site



Figure 5: A Google Earth satellite image of the preferred development site



Figure 6: A Google Earth satellite image of the proposed alternative development site

Both the preferred and proposed alternative sites are vacant and undeveloped as shown by the latest Google Earth satellite imagery in **Figures 5 and 6** above. Access to both sites is from Madadeni Road (P483) linked by existing informal gravel roads. Photos of the preferred development site were taken from the centre in all the cardinal directions as shown in **Figure 7** below.



Photos 1 & 2: View towards the east showing existing houses along the east to north eastern boundary of the development site



Photos 3 & 4: View towards the north and north west showing the existing electricity powerlines in the background



Photos 5 & 6: View towards the west and south west with houses in the background



Photo 7 & 8: View towards the south to south west with also houses in the background



Photo 9 & 10: Some of the alien and invasive plants spotted on site



Photos 11 & 12: View towards the south with existing houses in the bakground



Photo 13: A view from the existing access gravel road (D1334) heading north towards Isikhalsezwe High School



Photo 16: A view from the existing access gravel road heading south towards Madadeni Road (P483)

Figure 7: Photos of the preferred development site

As shown in the satellite imagery and photos above, the proposed development site is covered by secondary grasses infested with alien and invasive plant species. This shows the site has over the years been transformed by anthropogenic activities in the area such as cultivation, footpaths, livestock grazing and annual burning. The site is predominantly surrounded by settlements and the land in the area is already under increasing development pressure and Eskom has already demarcated the site to prevent being taken over by informal dwellers.

Alternative Site 2 is also predominantly surrounded by settlements from the southeast to the northwest. The site is predominantly covered by degraded grasslands which stretches towards the north across the Madadeni Road (P483).

It should be noted, the boundaries shown on all the maps in this report represent the site for the proposed Substation and is not an accurate representation of the footprint size. It is anticipated the total footprint size will be 100m by 100m which equates to 10 000m².

3.2.2 Alternative 132kV Bear line loop-in and loop-out route

Two alternative routes for the 132kV Bear line, loop in/loop circuit out of Parklands-Vlaklaagte 132kV line to the new proposed Matsheketsheeni Substation were taken into consideration mainly due to the wetland constraints and existing developed areas. No alternative routes for the powerline were taken into consideration in the previous application because the selected route was still vacant and situated far away from the wetland area. Settlements have been established along the selected route since then, thereby forcing the applicant to consider alternative routes (see **Figure 8**).

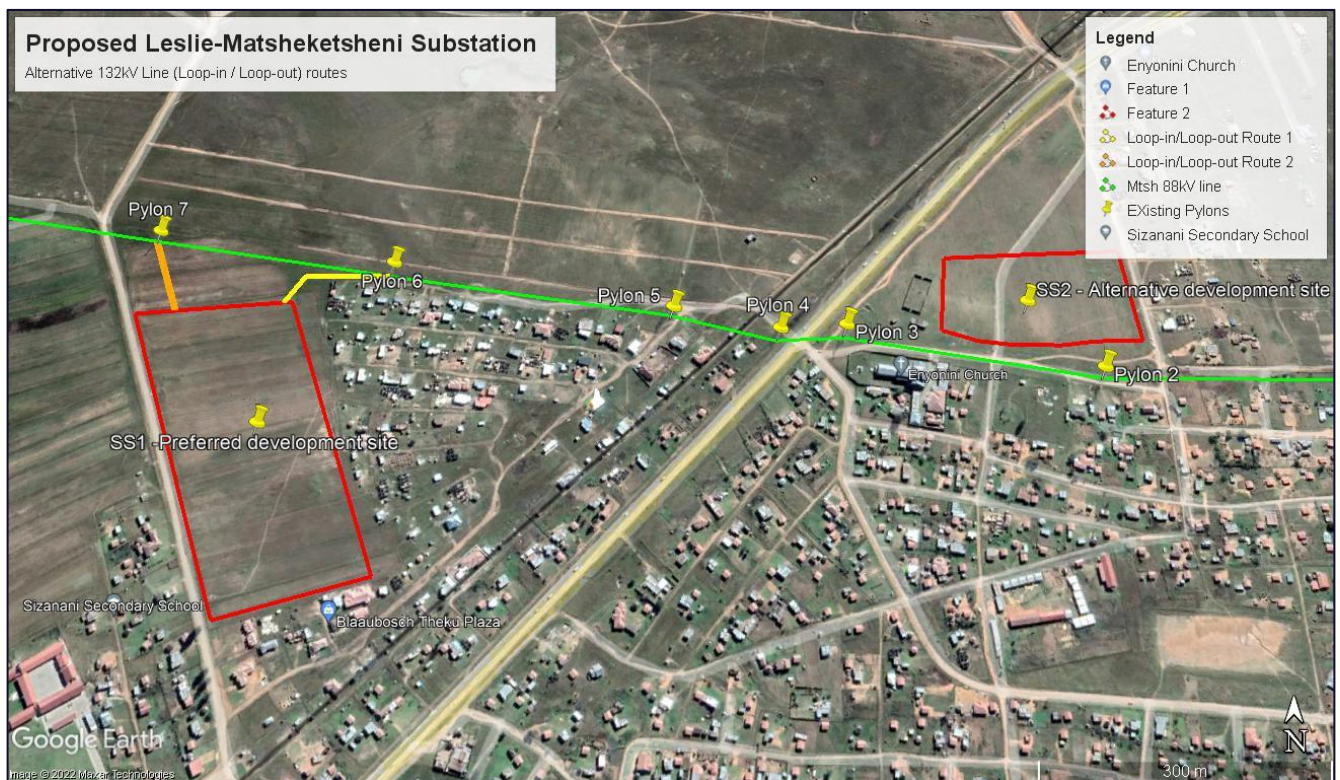


Figure 8: A Google Earth aerial view of the proposed and alternative sites including the powerlines

Loop-in/out Route 1 – Alternative option

The line connects from the existing Electricity Pylon 6 as originally proposed but deviates westwards to avoid the existing houses (see **Figure 9**). The line takes a 45-degree turn heading southwest to the connection point at the substation.

Loop-In 1 Geographical Coordinates		Loop-Out 1 Geographical Coordinates	
Start	27°45'19.40"S, 30° 7'41.29"E	Start	27°45'19.45"S, 30° 7'41.31"E
Mid	27°45'19.40"S, 30° 7'37.55"E	Mid	27°45'19.47"S, 30° 7'37.60"E
End	27°45'20.61"S, 30° 7'36.70"E	End	27°45'20.61"S, 30° 7'36.80"E

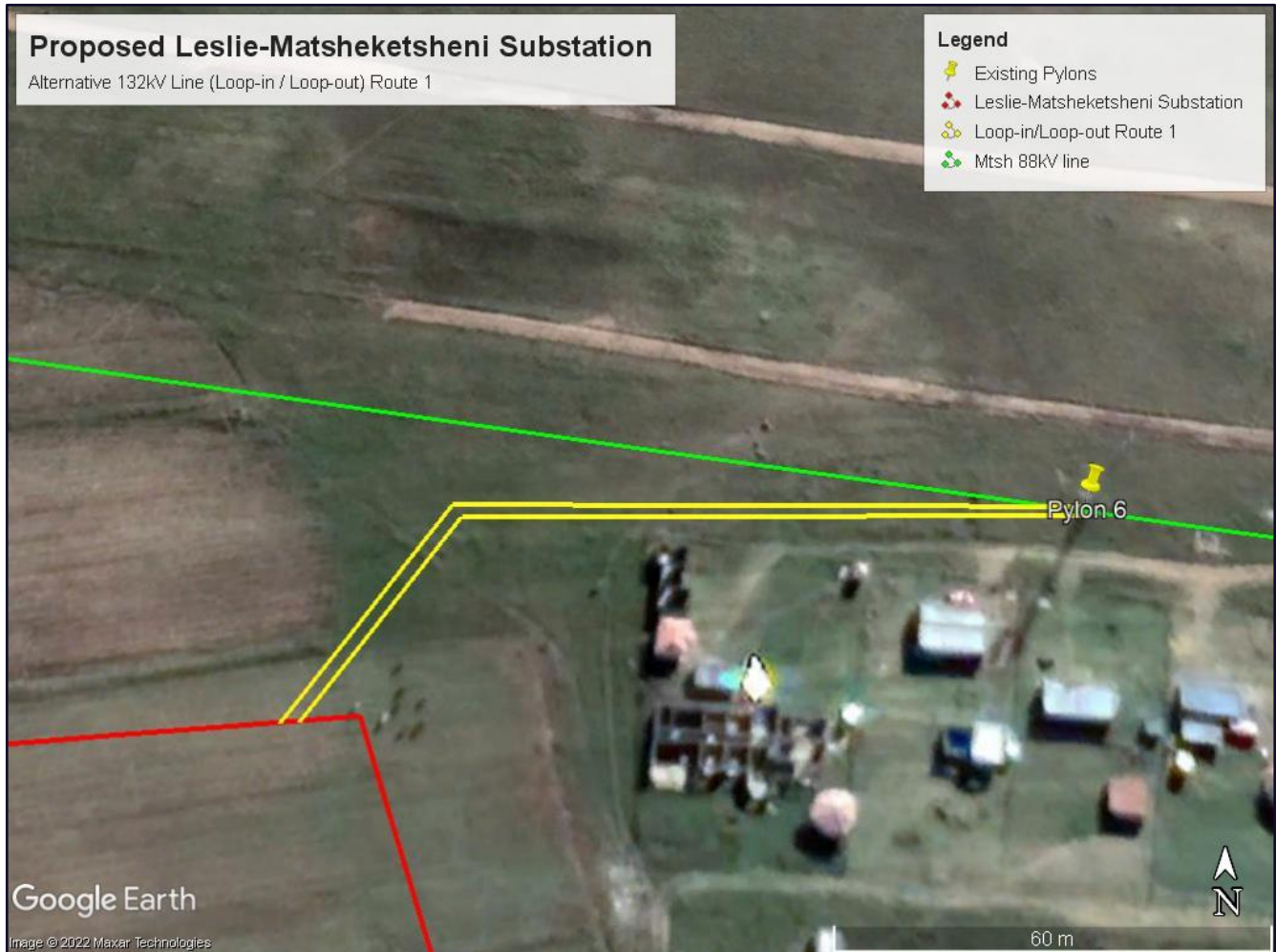


Figure 9:Alignment of the alternative powerline route

Loop-in/out Route 2 – Preferred route option

The line connects from the existing Electricity Pylon 7 and heads straight southwards to the connection point at the substation (see **Figure 10**).

Loop-In 2 Geographical Coordinates		Loop-Out 2 Geographical Coordinates	
Start	27°45'19.40"S, 30° 7'41.29"E	Start	27°45'19.45"S, 30° 7'41.31"E
Mid	27°45'19.40"S, 30° 7'37.55"E	Mid	27°45'19.47"S, 30° 7'37.60"E
End	27°45'20.61"S, 30° 7'36.70"E	End	27°45'20.61"S, 30° 7'36.80"E



Figure 10: Alignment of the proposed/preferred powerline route

From a technical and financial perspective, Route 2 (preferred option) is the most efficient and economical option as it follows a straight line

3.2.3 No-Go Option

The no-go alternative is the option of not undertaking the proposed activity or any of its alternatives. The no-go alternative also provides the baseline against which the impacts of other alternatives should be compared.

3.3 Powerline Servitude and Minimum clearances

Each line is anticipated to be approximately 300m in length with a 31 m servitude (i.e., 15.5 m on either side measured from the centre line of the powerline). A 50m buffer is proposed to accommodate final alignment adjustments.

3.4 Access

There is an existing gravel road (D1334) off the main road P438 (Madadeni Road) that leads to the proposed development site. The alternative site (SS2) is also accessible off Madadeni Road through an informal gravel road via Enyonini Church.

A new gravel access road (5m wide and 80m long) is proposed from the existing gravel road D1334 into the proposed substation site, cross section of the access road will have a 2% cross fall.

The new gravel access will provide easy access for the low bed vehicles to deliver mobile transformer equipment to the substation. The new access road will be shaped and constructed with layers consisting of:

- ✚ 150mm Rip and Re-compacted in-situ material to 90% MOD AASHTO Density.
- ✚ Lay, install and place Rock grid PC geotextile fabric on the road (100x100 x 52kN/m²)
- ✚ 150mm G8 Sub-grade Layer and compact to 90 % of modified AASHTO density.
- ✚ 150mm G7 Sub-base Layer and compact to 93 % of modified AASHTO density.
- ✚ 150mm G4 gravel wearing course and compact to 95% MOD AASHTO density,
- ✚ All according to SANS 1200 and Eskom guidelines.

The turning circles are designed with a radius of 20m to enable easy manoeuvring of heavy vehicles and a road width of 5m.

Where possible, existing access roads or tracks will be used to gain access to the construction site and the servitude. Where no access roads or tracks exist, the access points and roads will be negotiated with the relevant landowner and will be limited to single tracks as close to the servitude/within the servitude as possible. These will be established during the construction phase. All existing access roads will be maintained in good condition, and all new access roads rehabilitated when no longer required.

3.5 Construction

The proposed substation development mainly entails the construction of the following:

- ✚ Substation platform;
- ✚ Installation of 132KV columns, isolators, breakers, and plinths;
- ✚ 2 x HV 132kV Terminal Towers;
- ✚ 4 X MV 11kV distribution lines;
- ✚ 4 X MV 22kV DISTRIBUTION LINES
- ✚ Control room including ablution facilities;
- ✚ Access road;
- ✚ Stormwater drainage structures; and
- ✚ Fence and gate.

Construction of the substation involves in brief the following actions:

- ✚ Bulk earthworks, drainage, and road-works to establish a substation platform;
- ✚ Establish access road with its earthworks and associated drainage systems;
- ✚ Construct foundation for the associated equipment;
- ✚ Establish bund walls for transformer 1, 2 and the NEC'S;
- ✚ Construct passive fire protection for a 40MVA oil dam;
- ✚ Construct a new control room and all its entities;
- ✚ Establish new fence around the substation yard;
- ✚ Installation of kerbing around the substation yard;
- ✚ Establish new earthmat;
- ✚ Rehabilitation of the site upon completion as per the Environmental management plan;
- ✚ Testing and commissioning; and
- ✚ Continued maintenance.

All construction activities will be conducted according to Eskom standards and guidelines, or SANS specifications, whichever is applicable.

3.5.1 Bulk Earthworks

It is anticipated that the substation will mainly be built on fill material to create the proposed terrace and this will be of the order of not more than 2 metres in height. The construction of the earthworks shall be carried out in accordance with the requirements given in the *ESKOM Distribution Standard: Standard for Roadworks for Substations and Access Roads, dated September 1999*. The requirements given in these guidelines conform to SANS1200 DM. The following procedure for the construction of general fill or subgrade is given as follows:

- ✚ All vegetation and shrubs will be cleared from the areas over which the platforms are to be constructed before any cutting or filling activity on site. 150mm of topsoil will be removed and spoiled stockpiled for later use.
- ✚ Cut to fill to the required levels as per ER00690-17-01.
- ✚ The material used for fill should meet G7 quality requirements, i.e. minimum CBR =3 at 90% MDD compaction.
- ✚ The upper 150mm of the in-situ subgrade will be ripped and re-compacted to minimum 90% MDD before fills are placed.
- ✚ Fills will be placed in layers not exceeding 200mm loose thickness, and compacted to a minimum of 90% Modified AASHTO maximum dry density. Boulders larger than 60mm in maximum dimension should not be included in the fill material.

The terrace is to be sloped at a gradient of 1% away from the main access road. The main access road ties into the existing D1334, and is graded at maximum 2% away from the proposed substation. Embankments shall be grassed to limit erosion of these banks and the problems associated with wash-away of embankments.

3.5.2 Fencing & Gate

The substation security fence shall be of the steel palisade type as per Eskom standards.

A temporary fence shall be installed as per the following specifications:

- ✚ Install a 2,4m high fence using wooden posts to which a 1.8m diamond mesh with a mesh size of 50mm x 50mm will be secured;
- ✚ 3 x strands of draw wire to be installed to secure the mesh to the posts and an additional 4 strands of barbed wire evenly spaced to be installed above the mesh;
- ✚ Top strand of barbed wire to be 50mm from top of posts;
- ✚ The fencing post spacing shall not exceed 4m intervals;
- ✚ The fence will be connected to the main earth mat as detailed in the *Earthing Standard D-DT-5240*; and
- ✚ Install the applicable danger labels on the fence.

The mesh shall be earthed using 10mm round copper laced into mesh from top to bottom. This also includes each end of the fence at 20mm intervals in between. All gates shall be earthed using flexible earth leads as per standard.

The fence shall be removed after construction and the site rehabilitated.

3.5.3 Transformer oil containment system

The proposed transformer oil containment system will be constructed as per the following specifications:

- ✚ **Oil Bund:** - the capacity of the bund is to be 60% of the oil holding capacity of the transformers. The bunds are to comply with Eskom Standard for Passive Fire Resistance (240-66917056). This bund is to be drained by a manhole to the oil dam. All levels to be confirmed on site by project engineer.
- ✚ **Manholes:** - a manhole is to be constructed adjacent to each bund. Each bund is to drain to these manholes which are connected to the oil holding dam, ranging from 700mm to 1500mm. All levels to be confirmed on site by project engineer.
- ✚ **Pipework:** - 300mm Ø concrete pipes are proposed between the oil bund sump, manholes and oil holding dam. These are to have a minimum cover of 800mm to the top of the drainage pipe. The fall of the pipes is to be a minimum of 1:50 and where there is a crossing between the pipes and electrical cables there are to be no joints in the concrete pipes within 600mm of either side of the cables and there must be a clearance of at least 300mm between the top and/or bottom of the pipe as is applicable. Yellow cable/pipe identification tape is to be laid over/beneath the pipe as is applicable. All levels to be confirmed on site by project engineer.
- ✚ **Oil Holding dam:** - construct a new oil containment dam to be used for the two 33/11 kV Transformers with 30mpa concrete strength. The oil dam will be designed and constructed according to the applicable SANS specifications and Eskom standards, including the *Eskom standard for passive fire protection in distribution substation yards (240-66917056)*. The oil dam will be covered. Refer to the detailed

construction drawing (ER00690-20-05) attached as **Appendix C2**. All levels to be confirmed on site by project engineer.

- ✚ **Dissipater:** - construct concrete head wall with 300mm diameter hole for pipe penetration, including a concrete slab with concrete dissipater blocks cast in.

3.6 Services

The following services and resources will be required during the construction and operational phases.

3.6.1 Water Supply

Clean water supply, required for potable use and in the construction of the foundations for the substation and towers, will be sourced from the nearest municipal or authorised suppliers. No water will be abstracted from rivers or dams. The contractor shall make arrangements for procuring, transporting, storing, distributing, and applying the water needed for construction and other purposes, except where otherwise specified.

Water supply for the Control Room ablution services will be from an installed water tank. Water will be collected from the roof slab into this tank and piped into the building through a plumbing system, to the toilet and wash-hand basin.

3.6.2 Sewerage

Chemical toilets will be made available for use by project staff during the construction phase, which will be serviced regularly by the supplier. A ready-made type septic tank unit (calcamite or equivalent) shall be installed adjacent to the Control Room Building as indicated on the site plan, together with the associated soak-away drainage system.

3.6.3 Stormwater Management

Clearance of vegetation will result in exposed surfaces and increased run-off. The increased run-off post-development will be catered by means of berms, v-drains, cut-off drains, and kerbs.

- ✚ **Surface drains:** - it is proposed concrete surface v-drains be constructed at the eastern end of the substation terrace below the cut/fill line to help facilitate the rapid drainage of surface water to prevent over topping on fill embankments. Open cut-off drains shall be grassed on completion. Surface drains to be used are "V" shaped drains (cast in-situ) and concrete drifts (cast-in-situ). Refer to drawing ER00690-20-03 attached as **Appendix C3** for channel details.

A trapezoidal grass lined cut-off drain is proposed on the south end of the yard terrace to collect runoff from the area to the south end of the yard and direct flow into a boulder lined dissipater on the western, eastern end of the yard terrace.

- ✚ **Kerb:** - a new precast concrete kerb is proposed on the bell mouth as you enter the substation to facilitate surface water run-off and also act as a barrier to the side embankment. It shall also be installed around the yard with open vertical joints 20mm wide at 3000mm centres. This kerb is to sit at a minimum of 125mm above the road edge.

Completion of primary drainage at the substation site shall be implemented as a priority. After completion of the earthworks; the next priority task will be access road drainage, all cut-off drains in close proximity to the substation terrace and the associated dissipators. If deemed necessary, additional temporary diversions of existing drains and temporary cut-off drains shall be installed adjacent to any stockpiled topsoil to prevent this material being washed away, should heavy rain occur

All the stormwater will be managed in line with the *Eskom Guidelines for Erosion Control and Vegetation Management*, and the EMPr.

3.6.4 Solid waste

A designated waste sorting and storage area will be located inside the construction camp. All recyclable and non-recyclable waste generated during construction will be separated into scavenger and weather proof receptacles. Recyclable waste will be taken to the nearest registered or licenced recyclers while non-recyclable waste will be disposed at a licenced landfill facility. Hazardous waste will be stored separately in clearly marked weather proof receptacles for disposal at the nearest licenced hazardous waste landfill site. No significant amount of waste is expected to be generated during the operational phase. As such, waste generated during the operational phase is usually stored in weather proof bags and immediately transported off-site by the maintenance crew for disposal at the main depot.

SECTION 4: POLICY AND LEGISLATIVE CONTEXT

This section describes the South African (national), provincial, and local environmental; legislation, policy, standards, and guidelines applicable to the proposed development.

4.1 NATIONAL

4.1.1 National Environmental Management Act, 1998 [Act 107 of 1998], as amended

The National Environmental Management Act (NEMA) provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

This basic environmental assessment process is in terms of the general objectives of Integrated Environmental Management prescribed under Section 23 (2)(b), (c), &(d) of the Act. *The general objective of integrated environmental management is to —*

- (a) *identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;*
- (b) *ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;*
- (c) *ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;*

The proposed substation development and associated infrastructure requires environmental authorisation in terms of Section 24 of the Act. This requirement is regulated in terms of the Environmental Impact Assessment Regulations, 2014 (as amended) promulgated under Section 24(5) of the Act. In terms of these Regulations, certain activities are listed in Listing Notice 1 (GNR 983) and Listing Notice 3 (GNR 985), 2014 (as amended) for which a Basic Environmental Assessment process is required as part of the application for environmental authorisation. While, activities identified in terms of Listing Notice 2 (GNR 984) of 2014 are required to follow a full Scoping and Environmental Impact Assessment process. The electricity distribution capacity of the substation as well as the associated construction activities, triggers Listing Notice 1 as indicated in Table 1 below. As such, a Basic Environmental Assessment process is required as part of the application for environmental authorisation

Table 1: List of applicable activities in terms of the EIA Regulations, 2014

Listing Notice	Activity	Applicability
Listing Notice 1 of 2014, (GN.R. 983), as amended	Activity 11(ii): The development of facilities or infrastructure for the transmission and distribution of electricity—(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;	<i>The proposed substation has a capacity of 275 Kilovolts or more, and the proposed development site is situated inside an urban area.</i>
Listing Notice 1 of 2014, (GN.R. 983), as amended	Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	<i>The proposed 300m loop-in and loop-out power lines traverse above a wetland area and the activities associated with the installation of the power lines might involve the dredging, excavation, removal or moving of soil of more than 10 cubic metres from the wetland.</i>
Listing Notice 1 of 2014, (GN.R. 983), as amended	Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation...	<i>The total development footprint of the proposed substation is 1 Hectare or more and the vegetation on the proposed development site falls within</i>

		<i>the definition of “indigenous vegetation” as defined in the EIA Regulations, 2014 (as amended).</i>
Listing Notice 1 of 2014, (GN.R. 983), as amended	Activity 32: The continuation of any development where the environmental authorisation has lapsed and where the continuation of the development, after the date the environmental authorisation has lapsed, will meet the threshold of any activity or activities listed in this Notice...	<i>The proposed development was granted environmental authorisation (Ref No.14/12/16/3/3/1/1068) by the then Department of Environmental Affairs (DEA) in 2016. The environmental authorisation was valid for a period of 5 years and lapsed before the commencement of the development.</i>

The objective of this basic assessment process is in terms of Appendix 2 of the EIA Regulations, 2014 (as amended), which aims to, through a consultative process –

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

The competent or decision-making authority for this application is the Department of Forestry, Fisheries, and the Environment (DFFE) as required in terms of Section 24C(2)(d)(iii) of NEMA.

4.1.2 Prescribed protocols in respect of specific environmental themes in terms of Sections 24(5)(a) & (h) & 44 of NEMA

These protocols, published in Government Notice No.1150 of 30 October 2020, prescribe the minimum report content requirements for development sites situated in a specific environmental theme as indicated in the Department of Forestry, Fisheries, and the Environment (DFFE) national screening tool. The requirements of Appendix 6 of the Environmental Impact Assessment Regulations, 2014, as amended, promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No.107 of 1998), are substituted by the protocols if the proposed development falls within a specific environmental theme.

Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the Environmental Impact Assessment Regulations, 2014, as amended.

The protocols require, prior to conducting a site sensitivity assessment, that the environmental theme of the site be identified based on the national environmental screening tool. The national environmental screening tool shows the proposed development site for the substation and associated infrastructure falls within the following environmental themes and associated sensitivity as summarised in Table 2 below. Refer to **Appendix D** for the screening report.

Table 2: Development site environmental theme sensitivities as identified in the national environmental screening tool

Environmental Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme	X			
Archaeological & Cultural Heritage Theme				X
Civil Aviation Theme				
Defence Theme				X
Paleontology Theme	X		X	
Plant Species Theme			X	
Terrestrial Biodiversity Theme				X

Based on the selected classification, and the environmental sensitivities of the proposed development footprint as indicated in Table 2 above, the following list of specialist assessments were identified for inclusion in the assessment report.

1. Agricultural Impact Assessment;
2. Archaeological and Cultural Heritage Impact Assessment;
3. Palaeontology Impact Assessment;
4. Terrestrial Biodiversity Impact Assessment;
5. Aquatic Biodiversity Impact Assessment;
6. Geotechnical Assessment;
7. Plant species assessment; and
8. Animal Species Assessment.

According to the protocols, it is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

Site verification was conducted to confirm the need for such specialist assessments, in particular for themes evaluated as very high, high, and medium sensitivity. The results of the site verification have been incorporated into this report under the relevant sections.

4.1.3 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act 36 of 1998 (“NWA”), regulates the manner in which water is used and applies to all water uses. Water use is defined broadly under Chapter 4 of the Act, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. According to the Act, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence.

The proposed development site falls within a 500m radius from the delineated boundary (extent) of a wetland to the north, which is defined as “a regulated area of a watercourse” in the *General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water Uses as defined in Section 21(c) or Section 21(i)*, published in Government Notice 509 of 2016. The General Authorisation permits water use activities in terms of Section 21(c) and (i) within a regulated water use area provided such activities have a LOW-RISK class as determined through a Risk Assessment Matrix conducted by a suitably qualified SACNASP professional member. However, State Owned Companies such as Eskom are exempted from the requirement to conduct an Environmental Risk Assessment for activities that fall within a regulated water use area subject only to compliance to the conditions of the General Notice. This implies the construction of the proposed substation and associated powerlines will have to be undertaken in compliance to the conditions of GN 509.

4.1.4 National Environmental Management: Biodiversity Act 2004 (Act No. 10 of 2004)

The purpose of the Biodiversity Act (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act and the protection of species and ecosystems that warrant national protection. Ecosystems that are threatened and in need of protection are listed in the *National List of Ecosystems that are threatened and in need of protection*, published in GN.1002 of 2011, in terms of section 52(1)(a) of the National Environmental Management: Biodiversity Act 2004 (Act No.10 of 2004). According to GN.1002, any impacts on a threatened ecosystem associated with any development that requires environmental authorisation should be avoided, minimised, mitigated, and or offset as appropriate.

The 2014 KZN Biodiversity Sector Plan from SANBI BGIS shows the proposed development site falls within the Grassland Biome (*Income Sandy Grassland Gs7*) ecosystem. The conservation status of this vegetation unit is classified by Mucina & Rutherford (2006) as "vulnerable" with 27% already transformed by anthropogenic activities such as cultivation, plantations, and urban sprawl. However, according to Mucina & Rutherford no serious invasion of aliens has been observed (probably due to low nutrient status of soils). Despite the classification as "vulnerable" by Mucina & Rutherford and in the 2014 KZN Biodiversity Sector Plan, the ecosystem is not listed in the *National List of Ecosystems that are threatened and in need of protection*, published in GN.1002 of 2011.

However, none of the primary grasslands were identified on the proposed development sites as confirmed by the findings of an Ecological Report by GJ McDonald (refer to **Appendix E1**) According to the report, both development sites are dominated by secondary grasslands due to historical cultivation.

4.1.5 National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004)

The National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004) (NEM:AQA), as amended, aims to *inter alia*: regulate air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation; provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.

Air pollution is defined in the Act as "any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances". Non-point or diffuse sources of air pollution associated with the proposed construction and operation of the substation as defined in the Act include:

- ✚ Dust and noise pollution during the construction phase; and

Chapter 4 of the Act provides measures for air quality management, including measures (Part 6) for the control of dust, noise, and offensive odours. Regulations for the control of dust emissions are prescribed in the National Dust Control Regulations, 2013 published in GNR 827, promulgated in terms of Section 53(o) and Section 32 of the NEM:AQA. The Regulations stipulate the maximum acceptable dust fall rates as a standard in residential and non-residential areas as indicated in **Table 3** below.

Table 3: Acceptable dust fall rates (GNR 827), 2013

Restriction Areas	Dust fall rate (D) (mg/m ² /day, 30 -days average)	Permitted frequency of exceeding dust fall rate
Residential area	D<600	Two within a year, not sequential months
Non-residential area	600<D<1200	Two within a year, not sequential months

The proposed development site is situated in a predominantly residential area, which means construction activities resulting in dust fall (deposition) rates recorded above the prescribed limit for residential areas as indicated in Table 2, will be required to comply with the conditions set out in the Regulations. In terms of Regulation 3(2), the method to be used for measuring dust fall rate and the guideline for locating sampling

points should be according to ASTM D1739:1970, or equivalent method approved by any internationally recognised body.

Regulation 4 empowers the air quality officer, to instruct any person reasonably suspected of contravening the dust fall rate standards, set out in Regulation 3, to undertake a dust fall monitoring programme as contemplated in sub-regulation 5.

Section 34 of the NEM:AQA allows the Minister to set national standards for the control of noise, either in general or by specified machinery or activities or in specified places or areas. Currently, the Minister has not yet promulgated such standards, but Noise Control Regulations in terms of Section 25 of the Environment Conservation Act, 1989 (Act No.73 of 1989) published in GNR 154 of 1992 are still applicable in certain provinces except in Gauteng. The area in which the proposed development site is situated can be classified as a Noise Sensitive Area (NSA) due to the tranquillity associated with semi urban-rural areas.

4.1.6 National Health Act, 2003 (Act No.61 of 2003)

Health Officers are required in terms of Section 83(1) of the Act to investigate any condition which:

- (a) constitutes a violation of the right contained in section 24(a) of the Constitution;
- (b) constitutes pollution detrimental to health;
- (c) is likely to cause a health nuisance; or
- (d) constitutes a health nuisance,

“Health nuisance” is defined in the Act as a *“situation, or state of affairs, that endangers life or health or adversely affects the well-being of a person or community”*. Electricity transmission and distribution infrastructure may endanger the life or health of workers and the local community through potential risks such as:

1. Electrocutation;
2. High magnetic field; and
3. Fire or explosion due to overload/lightning.

The above risks are extremely “Low” as measures to prevent the occurrence, and minimise the severity of such risks should they occur, are already incorporated in the design and construction of the substations. In addition, workers are required to follow strict occupational health and safety measures during the construction and operational phases of the substation.

The National Norms and Standards for Environmental Health published in terms of Section 21(2)(b)(ii) of the Act, aim to promote compliance to Environmental Health (EH) related legislation and to provide a national approach in standardising activities in the delivery of Environmental Health Services (EHS) and establish a level against which EHS delivery can be assessed and gaps identified. The Norms and Standards prescribes the principles, norms, and standards applicable to various environmental resources including premises. The proposed substation will be required to comply with the Norms and Standards during the operational phase.

4.1.7 Occupational Health and Safety Act, 1993 (Act No.85 of 1993), as amended

One of the main objectives of the Act is to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery. All construction related safety issues are regulated in terms of the Construction Regulations, 2014, published under Section 43 of the Occupational Health and Safety Act. The Act provides Regulations in terms of Section 43 for any matter of which, in the opinion of the Minister, is necessary or expedient in the interest of health and safety of persons at work or the health and safety of persons in connection with the use of plant or machinery, or the protection of persons other than persons at work against risks to health and safety arising from or connected with the activities of persons at work. One of these numerous Regulations applicable to the proposed development are the Electrical Machinery Regulations, 2011, which also apply to users who generate, transmit or distribute electricity overhead or underground to the point of supply.

4.1.8 National Environmental Management: Waste Act, 2008 (Act No.59 of 2008)

The Act seeks to protect health, well-being and the environment by providing reasonable measures for *inter alia*:

- ✚ Minimising the consumption of natural resources;
- ✚ Avoiding and minimising the generation of waste;
- ✚ Reducing, re-using, recycling and recovering waste; and
- ✚ Treating and safely disposing of waste as a last resort.

These measures are necessary for securing ecologically sustainable development while promoting justifiable economic and social development.

Section 16 of the Act requires a “holder” of waste to take all reasonable measures to manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impact. The appointed construction contractor is responsible for ensuring all the different types of waste streams generated during the construction phases of the proposed development are managed in an ecologically and socio-economically sustainable manner. Conversely, Eskom is responsible for ensuring all the different types of waste streams generated during the operational phases of the development are managed in an ecologically and socio-economically sustainable manner. A waste hierarchy approach of reduce, reuse, recycle, with disposal as the last option, will be implemented where practical in the management of all solid waste streams generated during the construction and operational phases of the development.

4.1.9 Conservation of Agriculture Resources Act, 1983 (Act No.43 of 1983)

The main objective of the Act is to provide for the conservation of the natural agricultural resources of South Africa by the maintenance of the production potential of land, by:

- ✚ The combating and prevention of erosion and weakening or destruction of the water sources; and
- ✚ The protection of the vegetation and the combating of weeds and invader plants.

Section 5 of the Act provides control measures for various land uses on agricultural land including:

- (a) the utilisation and protection of land which is cultivated;
- (b) the utilisation and protection of vleis, marshes, water sponges, water courses and water sources;
- (c) the regulating of the flow pattern of run-off water;
- (d) the utilisation and protection of the vegetation;
- (e) the control of weeds and invader plants; and
- (f) the restoration or reclamation of eroded land or land which is otherwise disturbed or denuded.

The proposed development site is still currently zoned as agricultural land and the activities associated with the proposed substation development may be controlled in terms of Section 5 of CARA. In addition, the Alien and Invasive plant species identified on the development site may involve the use of methods listed in the Conservation of Agricultural Resources Act.

4.1.10 National Veld and Forest Fire Act, 1998

Chapter 4 of the Act places a duty on land owners to prepare and maintain firebreaks. Section 12(1) of the Act, requires every owner on whose land a veldt fire may start or burn or from whose land it may spread, to prepare and maintain a firebreak on his or her side of the boundary between his or her land and any adjoining land. The vegetation on the proposed development site is primarily grassland, and all grassland areas in South Africa are generally prone to veld fires. A firebreak will have to be maintained around the substation in line with the requirements of the Act.

4.1.11 Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970)

The Act restricts the subdivision of agricultural land except with the permission of the Minister of the Department of Agriculture (Minister). Section 3(e)(i) of the Act requires, “*no portion of agricultural land, whether surveyed or not, and whether there is any building thereon or not, shall be sold or advertised for sale, except for the*

purposes of a mine as defined in section 1 of the Mines and Works Act, 1956 (Act No. 27 of 1956)”, unless the Minister has consented in writing.

A written consent from the Minister will be required for the subdivision of the proposed development site.

4.1.12 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The purpose of the National Heritage Resources Act is to prevent the destruction or unsympathetic alteration of heritage resources that have either Formal or General Protection. The following are the most important sites and objects protected by the National Heritage Act:

- ✚ Structures or parts of structures older than 60 years;
- ✚ Archaeological sites and objects;
- ✚ Paleontological sites;
- ✚ Meteorites;
- ✚ Ship wrecks;
- ✚ Burial grounds;
- ✚ Graves of victims of conflict;
- ✚ Public monuments and memorials;
- ✚ Structures, places and objects protected through the publication of notices in the Gazette and Provincial Gazette;
- ✚ Any other places or objects which are considered to be of interest or of historical or cultural significance;
- ✚ Geological sites of scientific or cultural importance;
- ✚ Sites of significance relating to the history of slavery in South Africa;
- ✚ Objects to which oral traditions are attached; and
- ✚ Sites of cultural significance or other value to a community or pattern of South African history.

Section 38(1) of the National Heritage Resources Act (No. 25 of 1999) (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

1. *“The construction of a **road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;***
2. **any development or other activity which will change the character of a site; and**
 - (i) **exceeding 5 000 m² in extent”.**

According to the findings of a Heritage Investigation conducted by Frans Prins of Active Heritage CC (refer to **Appendix E2**), no heritage resources were identified within the proposed and alternative development site footprint and no impact to the heritage landscape is anticipated. However, the national screening report shows the development site falls within a highly sensitive fossiliferous zone and a Palaeontological Assessment may be required subject to confirmation by the provincial and national heritage authorities.

4.2 Provincial

4.2.1 Kwazulu-Natal Nature Conservation Management Act, 1997 (Act No.9 of 1997)

The KZN-NCMA provides amongst other objectives institutional structures for nature conservation in Kwazulu-Natal. The Minister may, in terms of Section 3(a) and (b) proclaim an area described in such notice to be a protected area, and amend the boundaries of a protected area respectively. No such protected areas, as proclaimed in terms of Section 3(a) or (b), are situated or located near the proposed development site.

4.2.2 KwaZulu-Natal Planning and Development Act, 2008 (Act No.6 of 2008)

One of the major objectives of the KZN-PDA is to promote a planning and development system that redresses the historic injustices perpetuated by a fragmented planning and development system. It also aims to provide a fair and equitable standard from planning and development to everyone in the province, while accommodating diversity such as urban and rural needs. Chapter 3 of the Act regulates the subdivision and consolidation of

land. The subdivision of land for the proposed development site is subject to approval by the municipality in terms of Section 21(1) of the KZN-PDA.

4.3 Provincial and Local Environmental Spatial Frameworks

4.3.1 Kwazulu-Natal Biodiversity Sector Plan, 2014

The KZN Biodiversity Sector Plan–Terrestrial Biodiversity layer (see **Figure 11** below) shows the proposed development falls outside any critical biodiversity areas or ecological support areas.

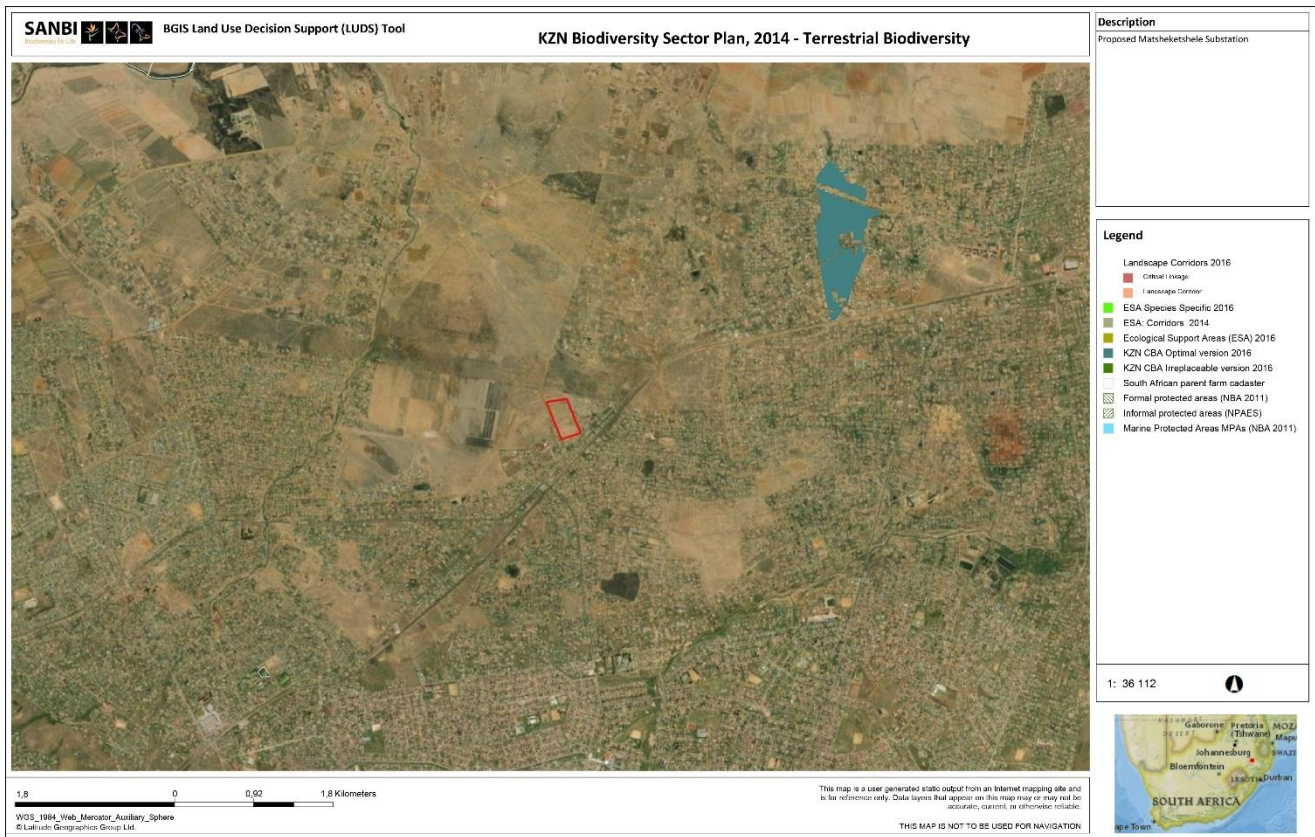


Figure 11: KZN Biodiversity Sector Plan-Terrestrial Biodiversity Map

The National Threatened Ecosystem layer (see **Figure 12** below) shows the proposed development site falls outside any threatened ecosystems listed in the *National List of Ecosystems that are threatened and in need of protection*, published in GN.1002 of 2011.

The National Freshwater Ecosystem Priority Areas (NFEPA) layer (see **Figure 13** below) shows the proposed development site is situated within 500m of a wetland on the neighbouring property to the northeast. The wetland is classified as a channelled-valley bottom wetland.

Refer to **Appendix B** for the A3 size Environmental Spatial Maps.

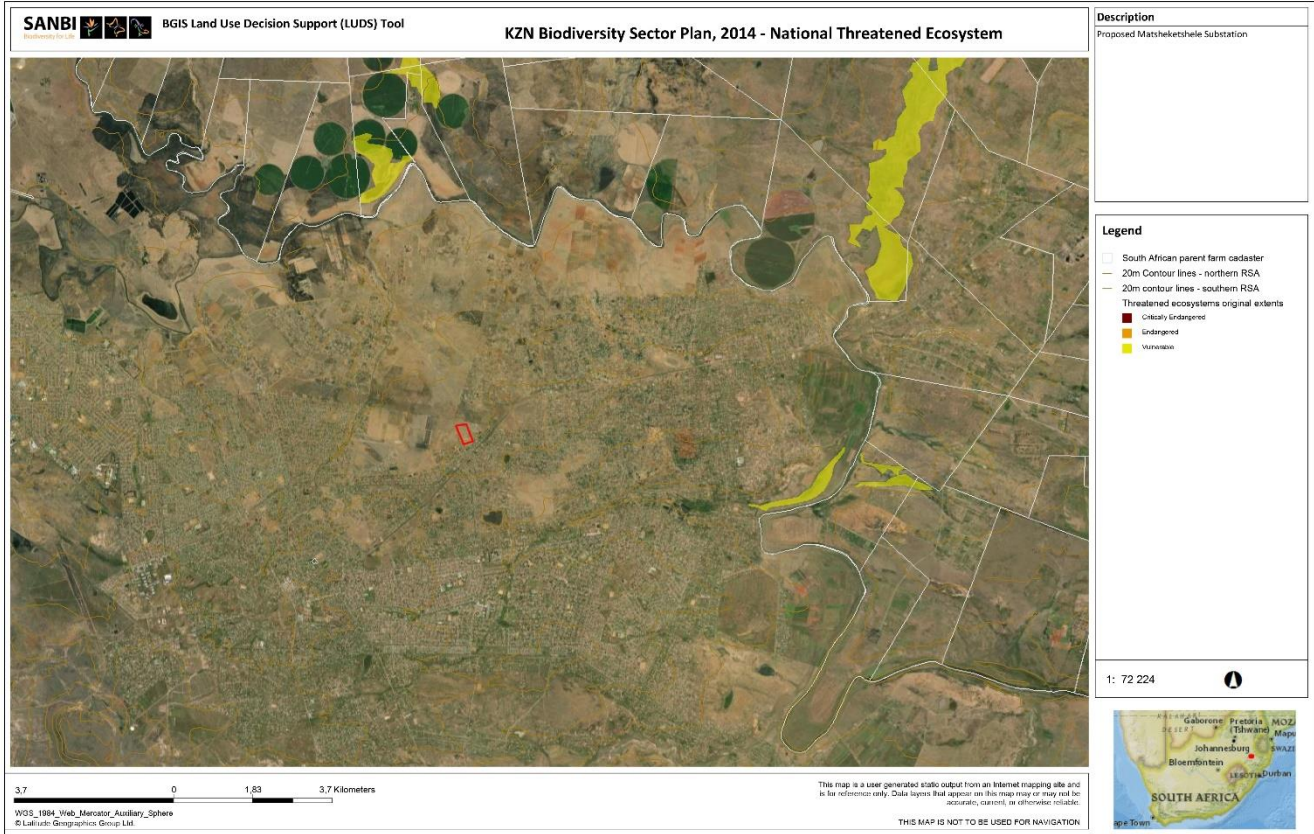


Figure 12: National Threatened Ecosystem layer

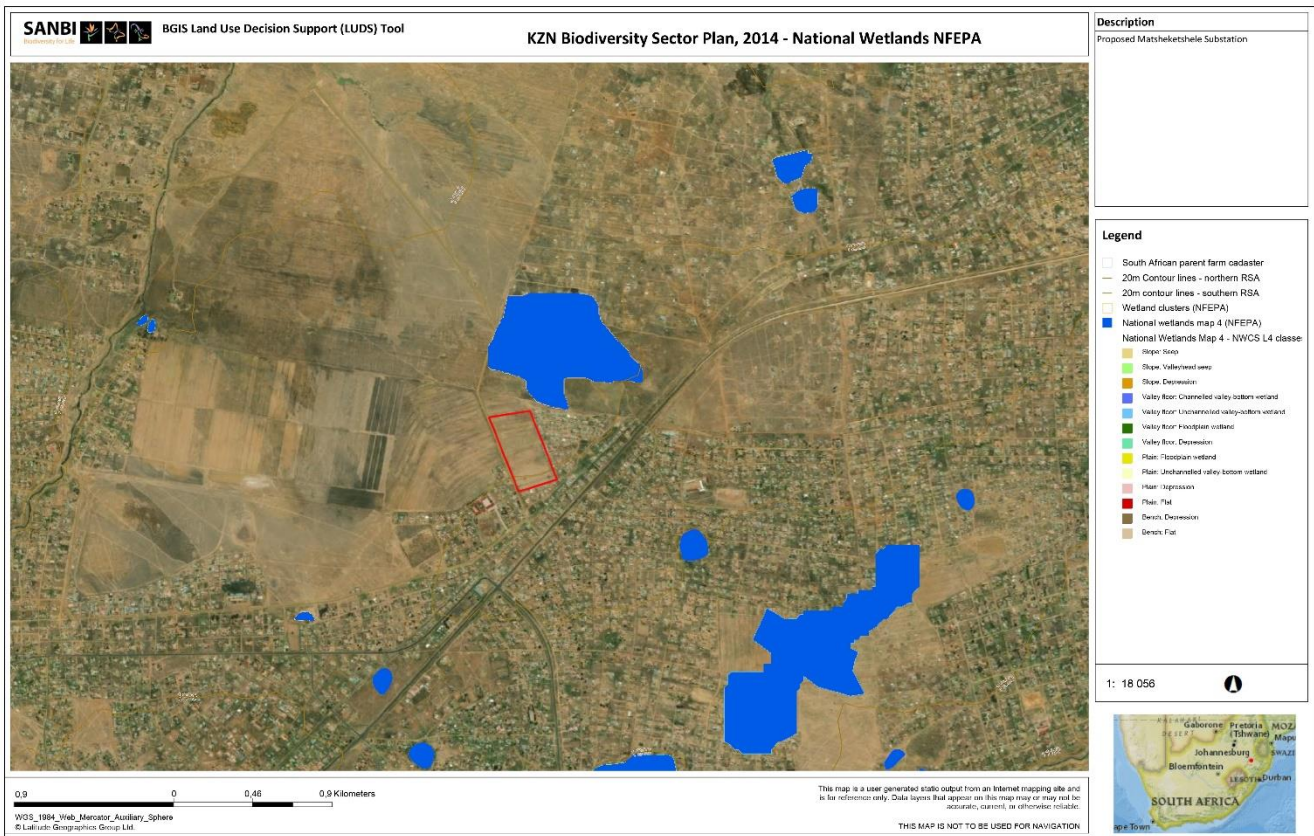


Figure 13: National Wetlands NFEPA layer

4.3.2 Draft KwaZulu-Natal Provincial Spatial Development Framework – Phase 3: Spatial Proposals, 2021

The draft KZN-PSDF is the fourth deliverable in the preparation of the KwaZulu-Natal (KZN) Provincial Spatial Development Framework (PSDF). It presents the spatial proposals for the Province and includes the refinement of a long-term spatial development vision indicating the desired spatial pattern in line with the development vision contained in the Provincial Growth and Development Strategy (PGDS).

The consolidated PSDF Map in Figure 14 below shows the proposed development site is located on land designated as an Urban Area and abutted to the south and further west by a Rural Settlement Area.

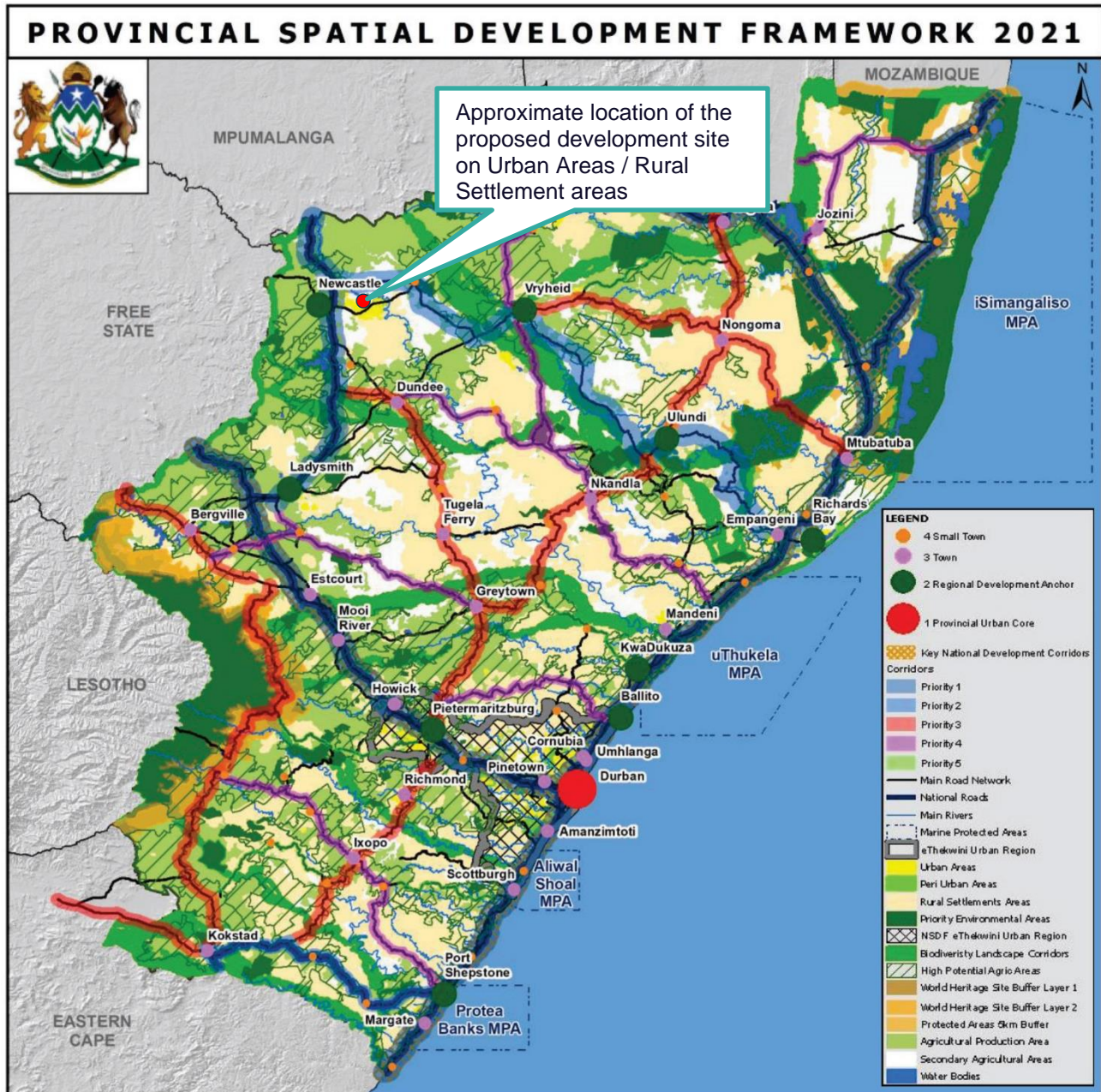


Figure 14: Consolidated PSDF Map showing the location of the proposed development site

Such urban areas are recognised as development nodes aimed at establishing cost effective service delivery due to a concentration of people and infrastructure, counter urban sprawl and focus on improving the

fragmented morphological form of certain settlements to become more efficient and sustainable. The purpose of the provincial development nodes subframe is to:

- ✚ Promote the concentration of people, movement and production at certain points for cost effective service delivery;
- ✚ Enable better access to social facilities and opportunities;
- ✚ Reduce Urban sprawl onto either sensitive environmental resources and/or productive agricultural land.

The ultimate objective of the PSDF in these urban areas is to promote compact urban development & combat urban sprawl.

Rural Settlements are identified in the PSDF as rural areas associated with the traditional authority and have the most poverty concentrations within the province. This, according to the PSDF, reduces accessibility (due to terrain, distance, and transport infrastructure) of these settlements to urban economic opportunities and necessitate the development of localised rural economic opportunities.

4.3.3 Amajuba District Municipality Environmental Management Framework – Draft SEA, 2019

The Amajuba District Municipality (ADM) - Environmental Management Framework: Draft Strategic Environmental Assessment (SEA), 2019, is identified as the third phase in a four-phase process of the Environmental Management Framework (EMF). The draft SEA aims to:

- ✚ Summarise the state of natural systems and discuss their socio-economic value;
- ✚ Identify, analyse and discuss the implications of key environmental issues – how the current state of natural systems is affecting people’s well-being and economic prosperity; and
- ✚ Establish a Desired Future State – objectives, targets and thresholds that will minimise/reverse negative impacts of the current situation and/or enhance positive aspects.

The EMF aims to guide development within the district towards sustainability by:

- ✚ Informing development planning;
- ✚ Informing the EIA process for specific development applications, and
- ✚ Providing management guidance for responding to key sustainability issues.

In terms of the state of Terrestrial Biodiversity in the ADM, the draft SEA highlights the *Income Sandy Grassland* has been heavily transformed through settlement and agricultural expansion and is the most transformed ecosystem within the ADM. There is limited protection for terrestrial biodiversity within the district.

The identified drivers and pressures for the loss of Terrestrial Biodiversity include –

- ✚ **Fragmentation:** Areas with high biodiversity conservation value within the district are highly fragmented, especially within the low-lying areas. This fragmentation is primarily as a result of the expansion of urban and sparse settlement and associated small scale agriculture. –
- ✚ **Urbanisation:** In recent years there has been an accelerated conversion of grassland to urban areas. Sparse urban areas themselves have progressively become more dense and open space on the Osizweni and Madadeni peripheries has been developed. *Much of this expansion happens outside of the environmental regulatory and municipal planning framework.*
- ✚ **Alien plants:** Rapid expansion of alien plants (wattle trees in particular) has resulted in large areas of grassland being lost in a short space of time (40 000 Ha in 20 years)

The draft SEA further highlights the development of residential areas is occurring at a rate that exceeds planning time frames resulting in settlement apparently driving planning. Development of housing areas also appears to be happening outside of the environmental regulatory framework with no record of environmental authorisation applications or records of decision for large areas of housing development.

In terms of the state of infrastructure in the district, the draft SEA describes the conditions of the roads, water supply, electricity, and was as follows:

- ✚ **Roads** have been identified as being in a deteriorating condition. Gravel roads are also noted to not always be constructed correctly resulting in rapid degradation and resultant impacts to vehicles and passenger safety.
- ✚ **Sewerage and waste water treatment systems** are ageing and overloaded, particularly by storm water ingress, resulting in the discharge of untreated waste water to the environment. Some facilities are also not treating waste to satisfactory standards resulting in water quality impacts to the receiving environment.
- ✚ **The water distribution network** is described as aging and incurs a high rate of water loss (uThukela water estimates 15 Ml per day). Investment in infrastructure is substantially less than is required (uThukela Water gives figures of 2.5 million budgeted in 2017 versus an estimated requirement of R10 Billion).
- ✚ **Electricity networks** are also constrained in certain areas meaning few new connections are possible in these areas.
- ✚ **Solid waste facilities** are under pressure. The available space at the main Newcastle facility is running out and a new site is in the process of being established. Two other sites in the district are not registered.

The identified main drivers and pressures for the increased deterioration of infrastructure in the ADM include:

- ✚ **Urbanisation and increased demand:** Recent rapid growth in urban areas (particularly Newcastle/Madadeni/Osizweni) has put increased pressure on all infrastructure categories, but particularly on water and sanitation systems and road networks.
- ✚ **Water supply:** Raw water supplies from existing developed resources in the ADM are constrained and demand for additional domestic connections adds pressure to this situation. There is currently insufficient water to fuel economic growth in the ADM. Ageing infrastructure also requires investment to reduce non-revenue water losses.
- ✚ **Sanitation:** Sanitation infrastructure is aging and the increase in urbanisation has put pressure on sanitation systems and has resulted in overloaded waste water treatment works.
- ✚ **Solid waste facilities are under pressure.** The available space at the main Newcastle facility is running out and a new site is in the process of being established. Two other sites in the ADM are not registered.

The state of wetland systems in the ADM is described in the draft SEA as follows.

“Wetland systems within the district are distributed unevenly. High concentrations of smaller systems are situated in higher lying areas, particularly in high water production areas such as around Groenvlei. These systems are largely in a relatively good condition. Systems in the lower lying areas tend to be larger and more impacted by anthropogenic activity, such as the Boschoffs Vlei and the systems in the highly transformed agricultural areas to the north of Ntshingwayo Dam”.

The main drivers and pressures responsible for the loss of wetland areas in the ADM are identified as:

- ✚ **Sand mining:** Many of the wetland systems are affected negatively by sand mining especially along river banks where wetland areas are present;
- ✚ **Urbanisation:** Many wetland areas are affected by urbanisation as urban sprawl has resulted in building of houses in wetland areas;
- ✚ **Agriculture:** Many wetlands within the district have been drained for agricultural purposes, while irrigation reduces available water for wetlands. Use of pesticides also is likely to impact wetland integrity; and
- ✚ **Alien invasive species:** Although they are unlikely to establish within wetlands, alien invasive tree stands in the catchment areas of wetland will have had a significant impact on wetlands through the elevated consumption / evapotranspiration of water, reducing the available supply to wetlands.

4.3.4 Amajuba District Growth and Development Plan ‘Vision 2030’

The vision is aimed at promoting economic and social development in the ADM by targeting direct programmes to those areas where it would have the greatest impact on local economies, to consolidate funding that flows

into local areas for economic development and to provide support services that would assist local communities in realising their economic goals and visions.

The ADM SDF Map indicates the proposed development site is situated in a Density Polygon (see **Figure 15**).

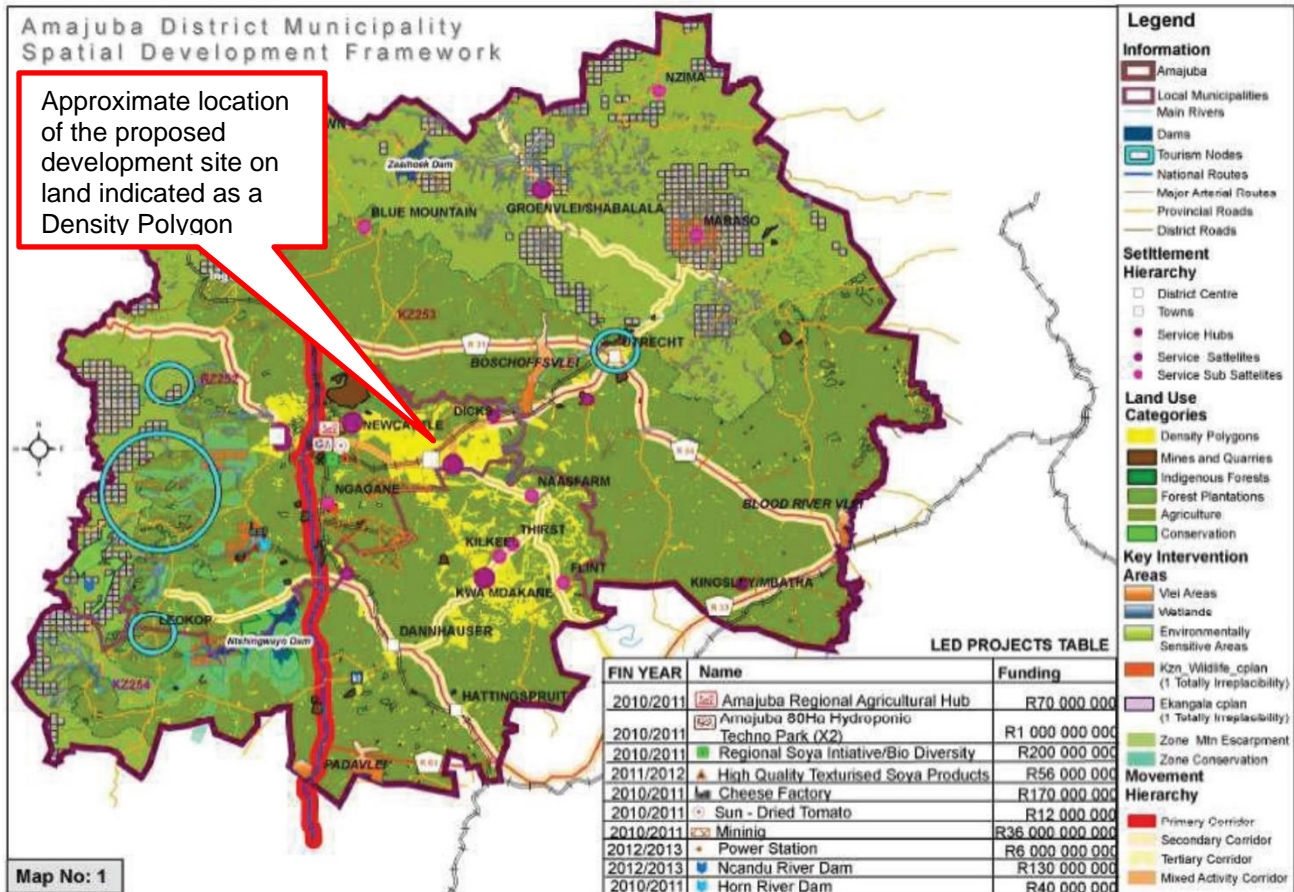


Figure 15: Amajuba District Municipality SDF Map showing the location of the proposed development site

According to the ADM-GDP, the density polygon indicates areas with a high population concentration to the north east of the town of Newcastle due to the racial segregation and industrial decentralisation policies during the apartheid era. These areas include residential and commercial, Newcastle industrial, Newcastle airport and rail yard, Madadeni residential and limited commercial, Osizweni residential, Dicks Halt residential, Jobstown and Mndozo residential.

4.3.5 Newcastle Local Municipality Final IDP Review (2021/22)

According to the Newcastle Local Municipality Final Integrated Development Plan Review (2021/22) – NLM-IDPr, the proposed development site is situated next to the JBC (Johnstown, Blaauwboch and Cavan) area which will be formalised as part of the JBC Framework. The Framework has already identified six development units or precincts, and recommends that these form the basis of a housing development program in the area. It further suggests the following initiatives for the area:

- Effective environmental management;
- Provision of bulk engineering services, particularly waterborne sewerage;
- Upgrading of main transport networks and the associated public transport networks. This includes walkways and pavements;
- Promoting local economic development through the development of a new town centre in the area; and
- Introducing an effective land use management system.

The Framework acknowledges the importance of Madadeni Road (P483) as the primary development corridor running through the area, with a number of mixed-use strips (activity streets). It also suggests at least three development nodes with the major node being the proposed JBC Town Centre.

The JBC is described in the NLM-IDPr as an area interposed by two formal Townships of Madadeni and Osizweni with a semi-rural/urban character and largely informally settled with no proper infrastructure in place, unlike other parts of Newcastle. It has a very limited economic and social infrastructure. As part of the Newcastle Local Municipality’s mandate of ensuring sustainable livelihoods, the NLM through the Municipal IDP and SDF has identified JBC as a key intervention area for investment and is regarded as a potential Primary CBD Node (JBC Mega Housing Development Project) as indicated in **Figure 16**.

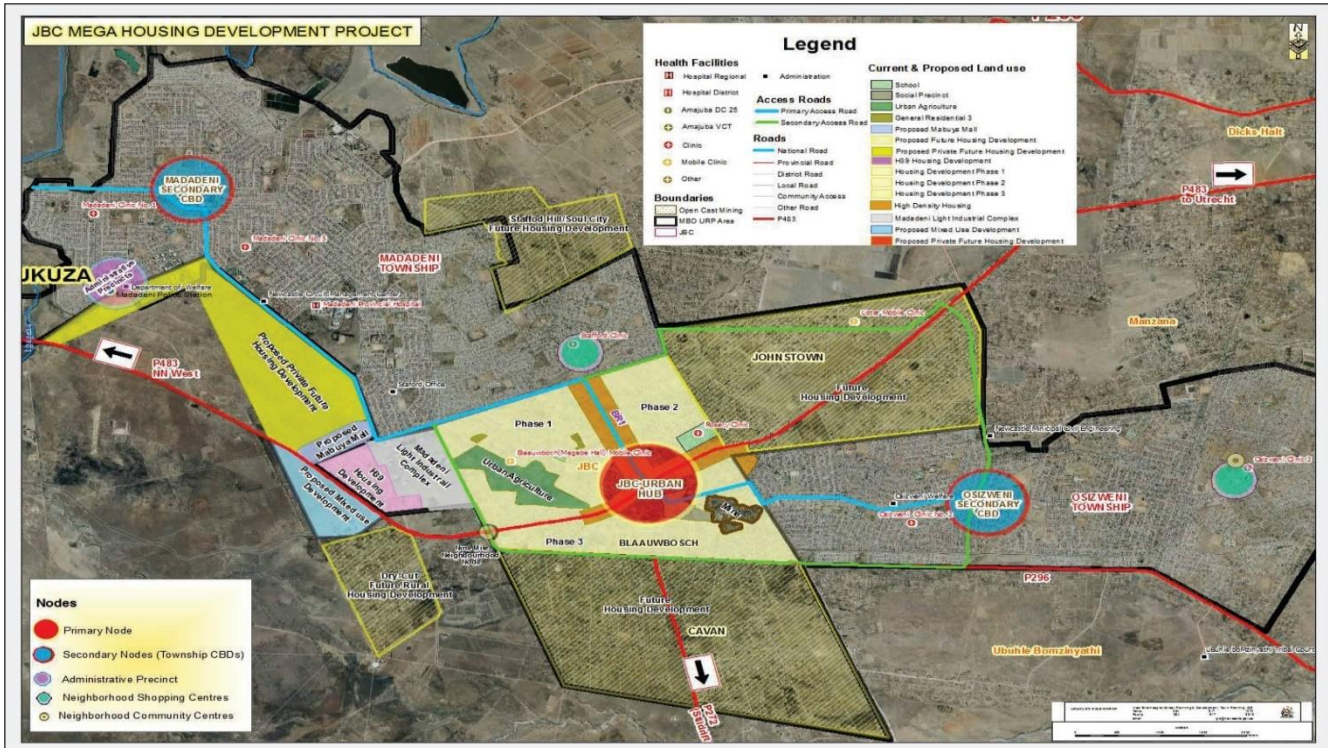


Figure 16: A spatial planning map of the JBC Mega Housing Development Project next to the proposed development site

“The vision for the future development of this area entails the establishment of a new CBD, with a range of housing typologies and eradication of informal settlements. Two major housing projects (JBC Phase 1 and JBC Phase 2&3) with a total yield of about 9511 mixed housing opportunities have been initiated by the municipality and province. Phase 1 consisting of 2011 units has been approved by KZN DHS and is currently at planning stage. Phase 2 and 3 is currently at prefeasibility stage”.

The JBC Mega Housing Development Project with a total 14 011 housing opportunities is listed nationally as one of the 8 Catalytic/ Mega Projects in KZN. The national Government intends through the Mega Housing development projects to unlock the investment opportunities for big projects that will yield between 10 000 and 20 000 different typologies of housing units.

The provision of sufficient services such as water supply, sewerage, and electricity supply are critical for the successful implementation of the Mega Project.

SECTION 5: NEED AND DESIRABILITY ASSESSMENT

The DEA Guideline on Need and Desirability (2017) defines the concept of “need and desirability” as relating to, amongst others, the nature, scale and location of development being proposed, as well as the wise use of land. Essentially the concept can be explained in terms of the general meaning of its two components in which need primarily refers to time and desirability to place (i.e., is this the right time and is it the right place for locating the type of land-use/activity being proposed?), “need and desirability” are interrelated and the two components collectively can be considered in an integrated and holistic manner.

According to the guideline, the “need and desirability” is determined by considering the broader community’s needs and interests as reflected in a credible IDP, SDF, and EMF for the area, and as determined by the EIA. “The need and desirability of development should be measured against the abovementioned contents of the IDP, SDF and EMF for the area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use reflected in, the area’s IDP and SDF”.

The proposed development site is situated in a semi-urban/rural area characterised by informal settlements with limited or inadequate services infrastructure. The Newcastle Local Municipality is unable to meet the demand for basic services infrastructure in the area. The NLM-IDPr highlights the NLM is currently confronted by competing demands between the need for maintaining existing roads within the urban areas and the provision of new roads in rural areas, including basic services. also competing demands for the provision. This challenge, according to the NLM-IDPr is further exacerbated by the need to attend to the various needs of the community whereas there are limited financial resources. The proposed development of the electricity substation is anticipated to lessen the demand for access to electricity in the area once operational, whilst also strengthening the existing Parklands-Vlaklaagte132kV power line network. This will also aid in meeting the anticipated demand for electricity as a result of the future proposed JBC Mega Housing Development Project.

According to Eskom, the proposed Leslie-Matsheketsheeni substation will enable de-loading of the substations at Vlaklaagte and Blaauwbosch which are presently experiencing voltage regulation problems due to increased demands, and thereby, improve the quality of electricity supply in the greater Newcastle area. The need for the substation stems from the need to inject stronger voltage into the local network that is presently experiencing capacity constraints caused by increased power demands and long-distance voltage regulation problems from far away supplying substations. Long distance voltage supply loses strength over the distance reducing its capacity to meet current and future local power needs. This will also lead to system failure and damage to electricity equipment.

In terms of the Spatial Planning of the area, the proposed development is compatible with the provincial, district, and local municipal spatial plans as indicated under subsection 4.3 above. The future proposed JBC Mega Housing Project is a major development that will increase the demand for electricity in the area.

In terms of the environmental settings, the proposed development site is already transformed due to historical cultivation and currently under threat from edge effects as a result of the surrounding settlements. The environmental spatial plans indicate the development site falls outside any ecologically sensitive areas in terms of terrestrial biodiversity. However, it falls within a 500m buffer from the edge of the channelled valley bottom wetland on the north east of the development site.

SECTION 6: BIOPHYSICAL & SOCIO-ECONOMIC ENVIRONMENT

The proposed development site is situated in the Lowveld of KwaZulu-Natal characterised by open grassland on flat plains and undulating hills. The majority of the project footprint is covered in dense surface grass with a small water pan occurring in its north-eastern corner. A small pocket of Wattle trees occur along the southern boundary of the site. Footpaths and a number of car-tracks traverse the site and a power line bisects the site from east to west. In places, site has been disturbed by apparent agriculture and burrowing activities but the general area seems to remain intact on terms of surface ecology and geo-morphology. The current Rietspruit farmstead occurs west of the product areas across the N11 road.

6.1 Biophysical Environment

6.1.1 Topography

The topography of the study area is classified as a Plain; an extensive area of low relief, generally characterised by relatively level, gently undulating or uniformly sloping land with a very gentle gradient that is not located within a valley. Moderately undulating plains predominate in the study area, with a few rocky ridges, pan depressions, and shallow drainage lines that form part of the Thukela catchment area.

The gradient of the development site is gentle and gravitates from the southern boundary at 1222m above mean sea level (amsl) through the northern boundary to the existing powerline connection point at 1213m amsl. The average slopes from the lowest point towards these two points are 0.1% and -2.0%. No defined natural drainage channels occur within 500m from the site boundaries. Pre-development run-off will be in the form of un-concentrated sheet flow through natural grass vegetation.

Potential impacts:

- ✚ Vegetation clearance during construction will increase run-off of exposed surfaces with consequent soil erosion and sedimentation downgradient.

6.1.2 Climate

The proposed development site is situated in a lowveld area characterised by a mean annual rainfall of between 500 - 750mm, and a mean annual average temperature of 17°C. Precipitation mainly in the form of thunderstorms occurs from October to March, with maximum rainfall normally experienced in November, December, and January as indicated in **Figure 17**. Rainstorms are often violent with severe lightning and strong winds, sometimes accompanied by hail. The winter months are mostly dry with the combined rainfall in June, July, and August making up only 3.9% of the annual total. Both minimum and maximum daily air temperatures are usually at their lowest during winter seasons and most extreme, in terms of heat, during December–January with a Mean Annual Potential Evaporation (MAPE) of 1845mm. Extreme cold is seen during winter where temperatures decrease to below freezing point.

Gs 7 Income Sandy Grassland

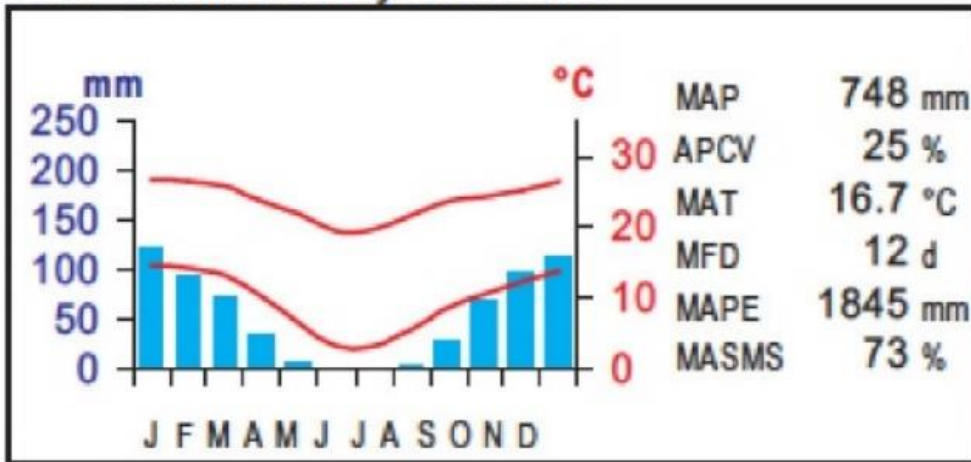


Figure 17: Climate graph for the Income Sandy Grassland (Mucina & Rutherford, 2006)

Potential impacts:

- ⚡ Localised flooding in the event of a storm or heavy downpour;
- ⚡ Damage to the substation equipment due to lightning and veld fire; and
- ⚡ Decline in air quality during construction due to dust and noise emissions.

6.1.3 Geology and soil

The 1:250 000 Geological Series Map for Vryheid (2730) indicates the proposed development site is underlain by fine to coarse grained sandstone, shale, and thin coal seams of the Vryheid Formation, under the Ecca Group and Karoo Supergroup (see **Figure 18** below). The Vryheid Formation consists of sandstone, dark grey mudstone and shale with coalbeds in places. Residual sandstone is expected to be shallow to moderately deeply weathered comprising sands and silty sand. These soils are anticipated to be moderately to highly compressible with a collapse potential. Residual shale is expected to comprise silt and clayey silt. These soils are expected to be potentially compressive with a moderate to high swell potential.

The Geotechnical properties of the residual soils on site are summarised in Table 3 below.

Table 4: Summary of the geotechnical properties of the residual soils on site

Lithology	Type of soil	Geotechnical properties
Sandstone	Silty sand: sandy silt	Pervious to semi-impervious soil; moderate to high erodibility; good to excellent compaction and workability.
Shale	Clay, silt, silty clay	Expansive clay; low shear strength; high settlement; slaking on exposure; semi- or impervious soil; dispersive soil; moderate to poor compaction or work-ability; unstable slopes. Breakdown of rock on exposure to atmosphere (slaking).

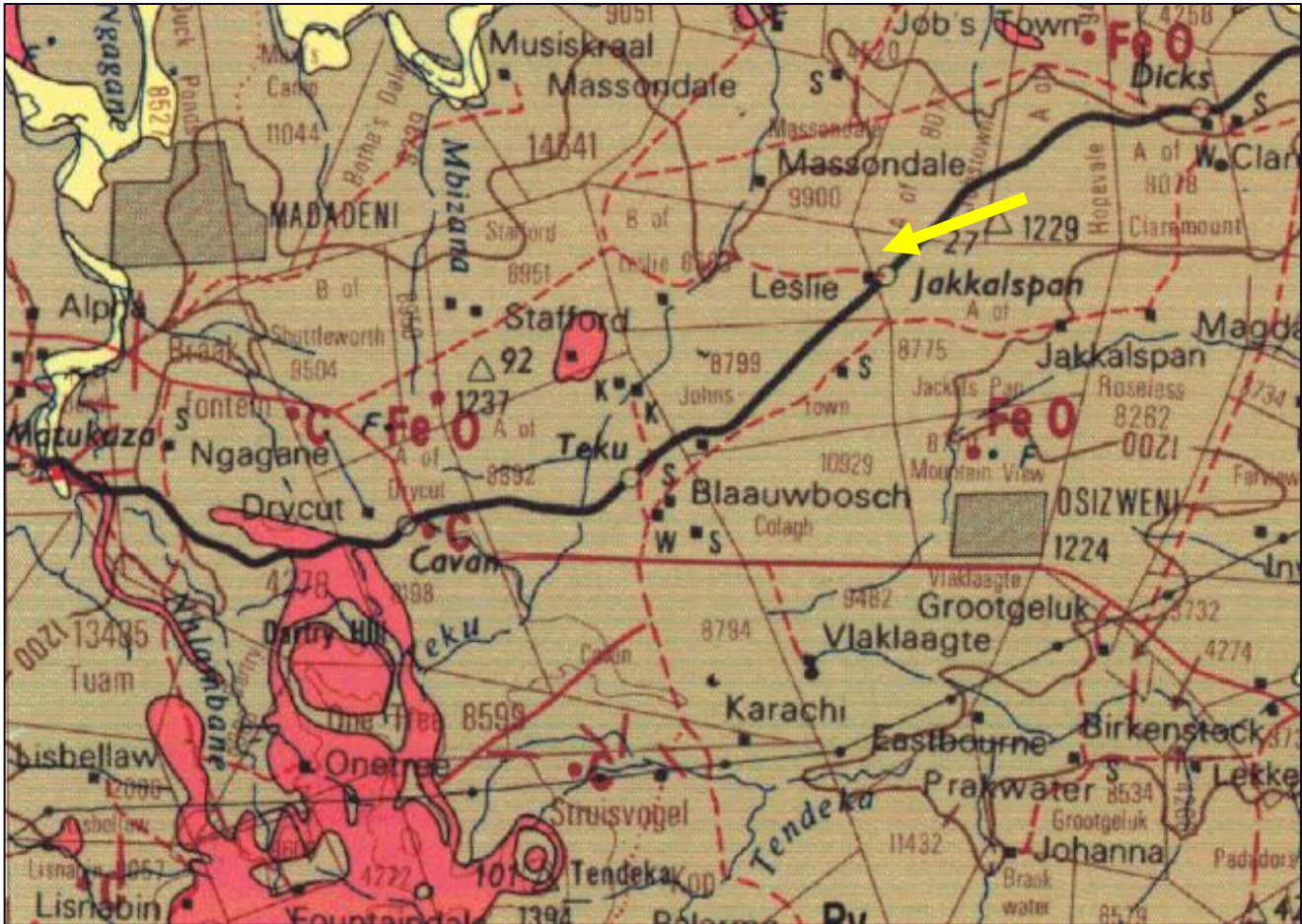


Figure 18: An extract of the 1:250 000 Geological Map Series for Vryheid (2730) showing the geology of the proposed development site (Council of Geoscience, 1988)

Potential Impacts:

- ✚ The silty sand is moderate to highly vulnerable to erosion particularly during site clearance;
- ✚ Geotechnical constraints related to clay and silty soils.

6.1.4 Drainage and hydrogeology

The proposed development site falls within the Thukela Water Management Area in Quaternary Catchment V32B, as shown in **Figure 19 below**. The natural gradient on the development site dictates the surface and groundwater water flow directions. No any defined drainage features or wetlands were identified on the development site. However, a wetland (classified as a channelled valley bottom wetland) is situated north east of the development site. Runoff generated on site (unmanaged) will enter drain towards the lowest point to the north before it ultimately drains into the channelled valley bottom wetland.

A site survey was conducted by an Ecological specialist, G.J Mc Donald, to identify wetlands that may occur on the development site and surrounding areas. According to Mr McDonald’s findings, wetland conditions were identified along the existing power line servitude to the north of the proposed development site (refer to **Appendix E1**). The wetland is classified as a Hillslope seepage wetland with “bench (hilltop/saddle/shelf)” characteristics. Wetland grasses and sedges were observed. The upper layers of the wetland (topsoil) were found inundated and covered with emergent grasses and sedges, but no open water associated with it. Evidence of permanent soil moisture conditions over a wider area is indicated by a high proportion of Hydrophytes such as *Cyperaceae* species.

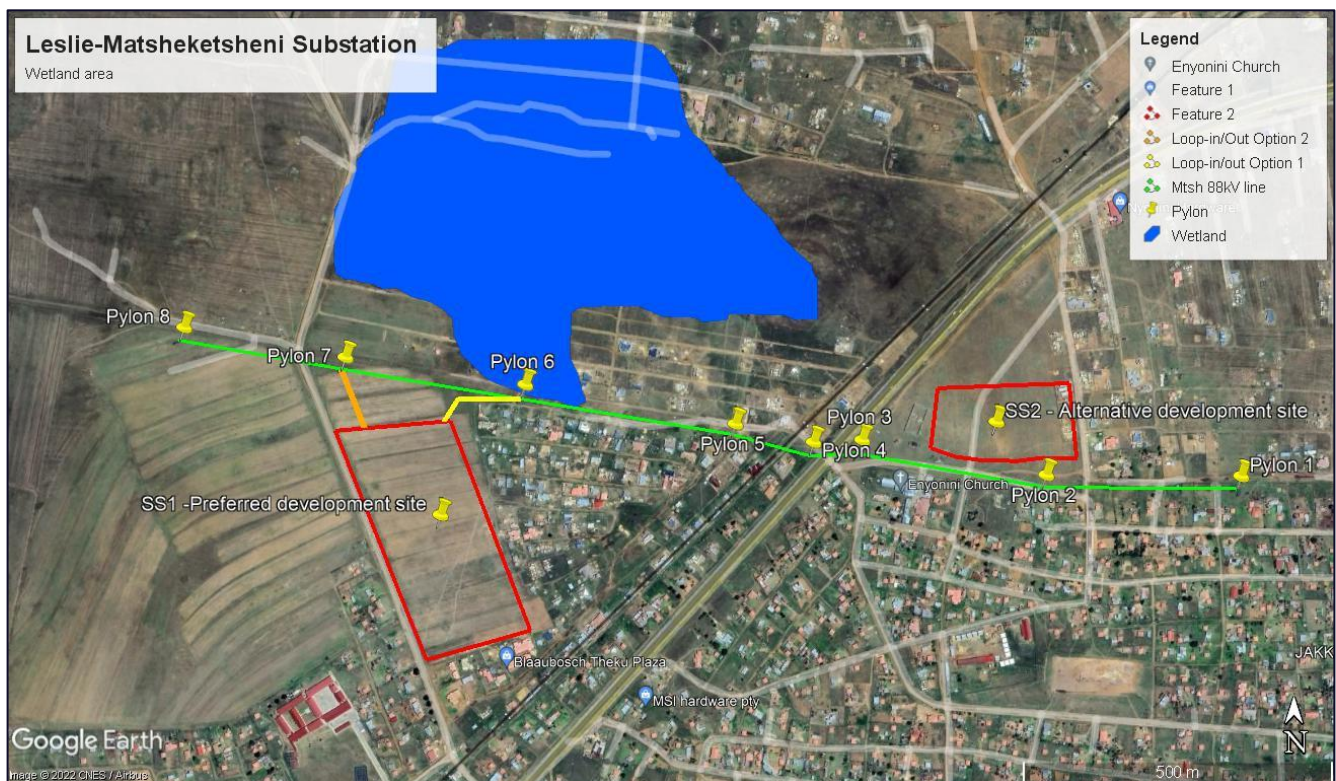
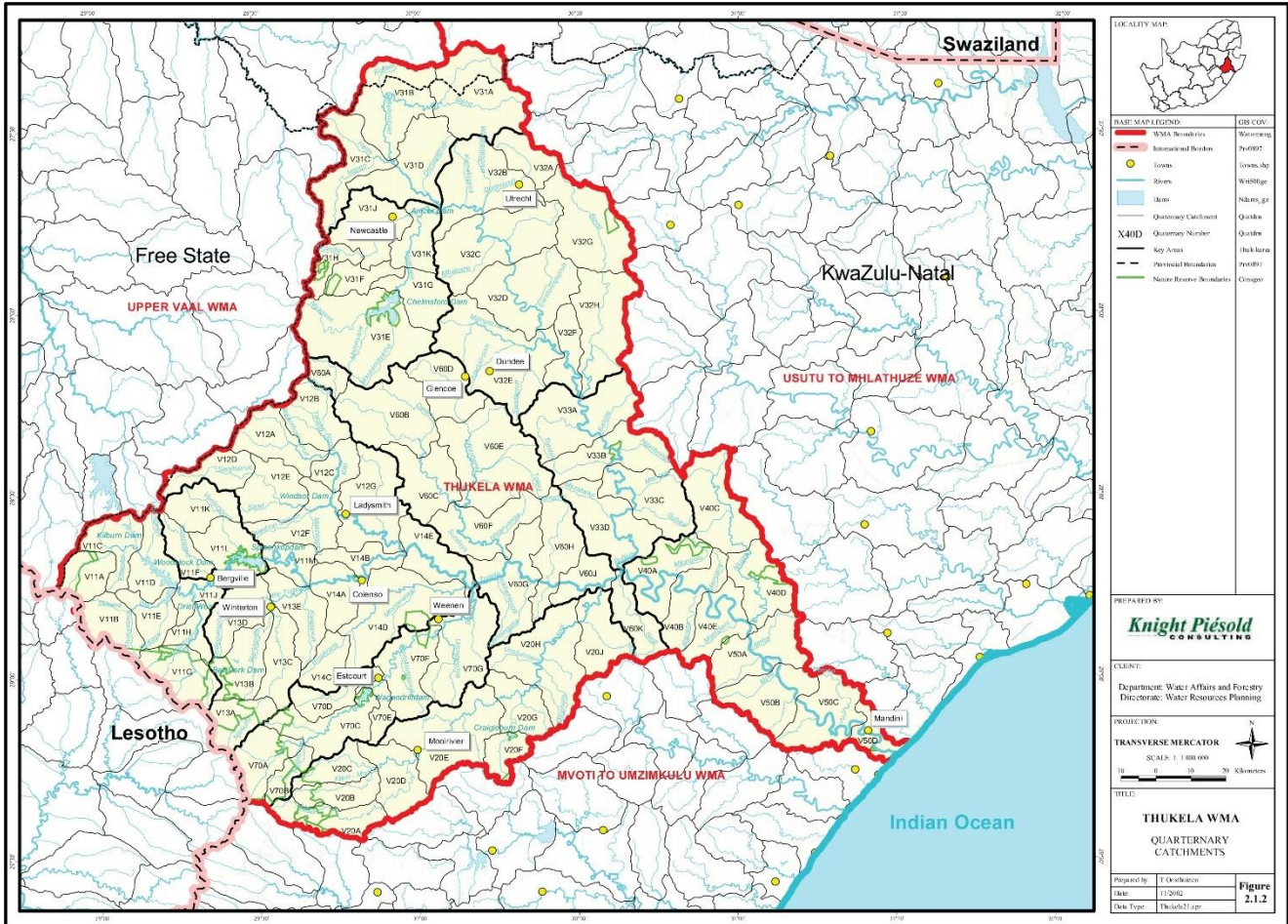


Figure 20: A Google Earth Map of the wetland area in relation to the extent of the proposed development site
 No wetland conditions were identified on the alternative development site (SS2) of the proposed substation.

Wetland delineation was conducted for the preferred development site as shown in **Figure 21** below. The vegetation of the site was used as an indicator of the edge of the wetland. The blue line delineates the wetland based on the changes in hygrophilous species. The yellow line is the existing powerline. The yellow dot indicates the dry area. The symbol for water indicates areas of the wetland with permanent moisture conditions.

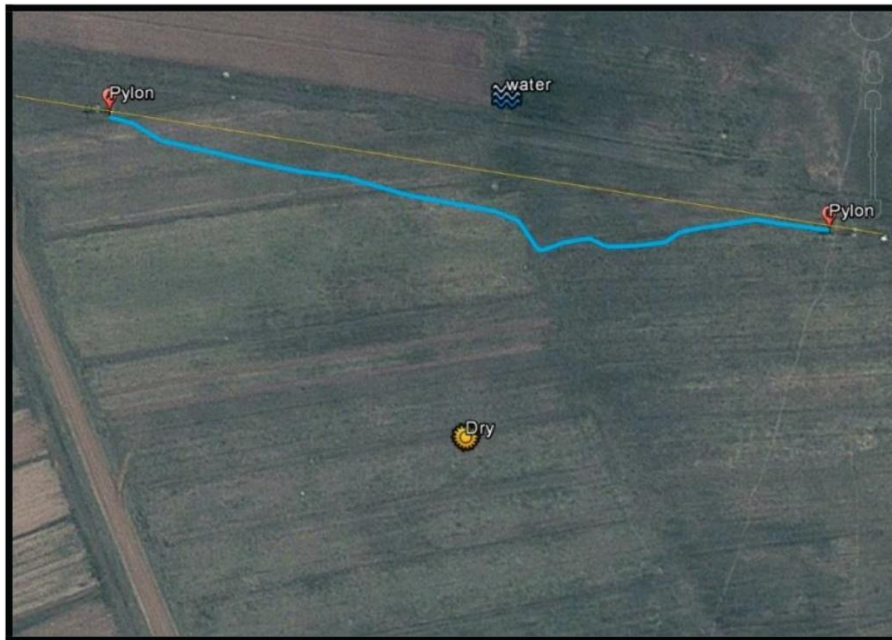


Figure 21: Delineated wetland buffer of the preferred development site.



Figure 22: Indication of changes in soil moisture

Figure 22 above shows a decrease in soil moisture from north to south and east to west towards the proposed development site. No soil moisture conditions were observed on the developments site.

Potential Impacts:

- ✚ Modification of the wetland hydrology and ecological functioning due to construction activities;
- ✚ Consequent decline or loss in the provision of ecosystem services;
- ✚ Contamination of surface and groundwater resources due to construction related activities; and
- ✚ Contamination of surface and groundwater resources due to potential overflow or leakage of oil contaminated stormwater from the transformer oil holding dam.

6.1.5 Flora and Fauna

According to the most recent description of the vegetation of South Africa (Mucina & Rutherford, 2006) the study site falls within Income Sandy Grassland (Gs7). It is described by Mucina & Rutherford as a tussock- dominated sourveld forming a mosaic with wooded grasslands (with *Acacia sieberiana var. woodii*) and on well-drained sites with the trees *A.karoo*, *A.nilotica*, *A.caffra* and *Diospyros lyciodes*. On disturbed sites *A.sieberian var. woodii* can form sparse woodlands. *Aristida congesta*, *Cynodon dactylon* and *Microchloa caffra* are common on shallow soils.

This vegetation type is classified by Mucina & Rutherford as vulnerable with 27% already transformed for cultivation, plantations, and urban land uses. Invasion by alien species was assessed as “low” probably due to low nutrient status of soils.

The vegetation on both proposed development sites (SS1 & SS2) is described in the Ecological Report by GJ McDonald (refer to **Appendix E1**) as secondary grassland. The SS1 site is cultivated land which has recently been allowed to lie fallow, while the SS2 site has been disturbed less recently, but still has a low biodiversity. No woody species were identified on both sites.

Avifauna

The Avifauna habitat on both the proposed and alternative sites is described as transformed and influenced by non-vegetation factors such as land use, topography, the distribution of food. The anthropogenic habitats for each site are summarised in **Table 5** below.

Table 5: Anthropogenic habitat for fauna

Site	Anthropogenic Habitat	Habitat description
SS1	Cultivated lands	These are often highly attractive to certain birds as a result of the food sources they provide. Fairly extensive agricultural activities may be found in the vicinity of SS1 and the site itself was cultivated in its recent history. Species known from the area that are likely to be attracted to this habitat include Blue Crane, Southern Bald Ibis, White Stork and White-bellied Korhaan.
SS2	Vacant urban allotment	The alternative substation site SS2 is a vacant lot which is situated near a Church and residences. Livestock were seen grazing and the vegetation indicates that the area is subjected to at least annual burning. The proximity to human activity and habitation and the frequent disturbance from livestock and burning is likely to make this habitat of limited use to any bird species of Conservation Significance.

No natural habitat was identified on both the proposed and alternative development sites. However, natural wetland conditions were identified along the existing 132 kv powerline where the proposed 300m loop-in and loop-out powerlines from the new substation will connect to. **This wetland area is considered as suitable**

habitat for water birds, Crane and Stork species, and certain raptors – all of which are considered collision-prone species when it comes to overhead powerlines.

The following avifauna species of **least conservation concern** were observed during the ecological survey: Barn Swallow; Speckled Pigeon; and Southern Red Bishop. However, no red listed species were observed, but the following in **Table 6** were identified as likely and highly likely to occur in the area.

Table 6: Red listed species from the QDGS 2730 CA found in the study area

Species	Conservation Status	Probability of occurrence
African Marsh Harrier	Vulnerable	Likely
Blue Crane	Vulnerable	Likely
Southern Bald Ibis	Vulnerable	Highly Likely
Lanner Falcon	Near-threatened	Likely
Secretary Bird	Near-threatened	Likely

According to the SANBI Grassland Ecosystem Guidelines, 2013, secondary grasslands are those that have undergone extensive modification and a fundamental shift from their original state (e.g. to cultivated areas), but have then been allowed to return to a 'grassland' state (e.g. when old cultivated lands are re-colonised by a few grass species). Although secondary grasslands may superficially look like primary grasslands, they differ markedly with respect to species composition, vegetation structure, ecological functioning and the ecosystem services they deliver.

In terms of ecological integrity, the vegetation is generally disturbed, degraded and transformed. Although species richness is medium these disturbed grasslands have a low conservation value and thus low sensitivity.

Potential Impacts:

- ✚ Loss of secondary grassland and related ecosystem services;
- ✚ Disturbance and potential loss of wetland and grassland habitats;
- ✚ Potential bird mortalities due to electrocution and collision with overhead lines;
- ✚ Displacement due to habitat loss associated with construction of the proposed substation;
- ✚ Loss of connectivity in landscape ecological and morphological processes; and
- ✚ Improved ecosystem services through the eradication of alien and invasive plants species.

6.2 Socio-economic Environment

6.2.1 Surrounding Areas

The proposed development site is situated in a semi urban-rural area predominantly surrounded by informal settlements, and cultivated grassland used for livestock grazing. It is surrounded by the following informal settlements: Jobstown to the northeast; Leslie to the northwest; Madadeni to the west; Masondale to the far north; Jakkalspan to the south; and Osizweni to the southwest. Theku Plaza shopping mall is located approximately 5.5 km from the development site. A school is situated approximately 200m southwest of the development site.

6.2.2 Local economy

The local economy in the area is largely informal characterised by informal traders and spaza shops. According to the Community Based Plan for Ward 6, 2021, a large proportion of the population is unemployed and those who are employed are largely working in the industrial areas of Emabhodini and Madadeni, including industrial companies such as ArcelorMittal and Karbochem.

6.2.3 Socio-economic dynamics

The high unemployment rate in Ward 6 is attributed to the low levels of tertiary education and skills in the area. The Community Based Plan also indicates a large proportion of the unemployed are below the ages of 24 with high migration rates of the skilled and economically active group of the population. The high migration rate has consequently resulted in a large proportion of the youth and elderly with a high dependency rate ratio. There is also a concomitant high dependency on government support through social grants. As a consequent of the high dependency ratio and unemployment levels, poverty levels are high in the area.

Access to basic services in the area is low with most of the households without water-borne sanitation system, clean tap water, and access to electricity. Although the 2011 census statistics indicate only 25% of the population had no access to electricity, this percentage has increased due to population growth and rapid urbanisation in the area.

Potential Impacts

- ✚ Community protests due to non-transparent recruitment process and labour practices during construction;
- ✚ Improved access to electricity supply and security in the local and municipal area ;
- ✚ Business opportunities for the local informal traders during construction;
- ✚ Employment opportunities for the unskilled and semi-skilled resulting in the reduction in poverty levels;
- ✚ Investment and development opportunities in the area, thereby creating more job opportunities for the local community; and
- ✚ Increase in traffic and dust emissions.

6.2.4 Cultural and Heritage Resources

A Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed development site by Mr. Frans Prins of Active Heritage CC. According to his findings (refer to **Appendix E2**), no heritage resources were identified within the proposed development site including the powerline route. The report recommends the proposed development may proceed from a culture resources management perspective, on the condition that mitigation and management measures recommended in the report are implemented, and provided that no previously undetected heritage remains are encountered during construction.

The report cautions cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits due to the larger heritage horizon which encompasses a rich and diverse archaeological landscape. There is a possibility of undetected archaeological remains occurring elsewhere in the project area.

Potential impacts:

- ✚ Destruction of undetected sub-surface heritage resources and artefacts during construction; and
- ✚ Removal of heritage resources and artefacts detected on site without permission from the heritage authority.

SECTION 7: PUBLIC PARTICIPATION PROCESS

The public participation process undertaken is in terms of Chapter 6 of the EIA Regulations, 2014 (as amended).

7.1 Public Notification

The public participation process commenced on the 9th of February 2022, and the surrounding local community including the public in general including was notified by the following means:

1. Publication of the notices in the weekly newspaper editions of the Northern Natal News in English, and the Amajuba–Eyethu in Zulu. Both newspaper editions were published on the 9th of February 2022. Refer to **Appendix F1** for copies of the published advert.
2. Display of the site notices at the corner of the road D1334 and Madadeni Road, along the western boundary of the development site, and at one of the Spaza Shops along the access road (D1334) leading to the development site (see **Pictures 1 – 6 below**); Refer to **Appendix F2** for copies of the Site Notices.
3. Distribution of the Background Information Documents (BIDs) in both English and Zulu to the Ward Councillor and Tribal Authority including the surrounding inhabitants. Refer to **Appendix F3** for copies of the BIDs.



Photos 1 & 2: Site notices displayed along the western property boundary facing the Road D1334



Photos 3 & 4: Site notices displayed on a local spaza shop at the corner Road D1334 and the road to Sizanani Secondary School



Photos 5 & 6: Site notices displayed on the western side of the T-intersection between the Road D1334 and Madadeni Road

Copies of the Background Information Document in English and Zulu were handed out to the Ward Councillor, Traditional Leaders and Council, and surrounding neighbours. State organisations and departments including other key stakeholders were provided with electronic copies of the Background Information Document (BID), which was also emailed to all registered Interested & Affected Parties on 09/02/2022. Refer to **Appendix F4** for proof of the email notifications.

Parties wishing to register as interested and or affected parties, or who had any comments, were requested to do so in writing within 30 days from the date of the notice or receipt of the BID. This period lapsed on the 22nd of March 2022.

The names of all the people who commented, or requested to be registered, have been captured into the I&APs database. Refer to **Appendix F5** for the updated I&APs database.

7.2 Comments received during the notification period

No comments were received following the notification period.

The following parties requested to be registered as I&APs:

7.3 Draft Basic Assessment Report

A copy of this draft Basic Assessment Report has been made available for public review at the **Newcastle Public Library, 66 Scott Street, Newcastle, 2940**, for a period of 30 days from the **12th of April 2022** to the **19th of May 2022**. In addition, the following state departments and key stakeholders were provided with a hard copy or CD copy of the report (**Table 7**):

Table 7: Draft BAR distribution list

State Department/Key stakeholder	Contact Details	Type and number of copies
Newcastle Public Library	Attention: Librarian - Ms Aletta Botes 66 Scott Street Newcastle 2940 Tel: 034 328 7617	1 x hard copy
KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (DEDTEA)	Attention: Mr Ntokozi Nkosi 43 Harding St, Newcastle CBD Newcastle, 2940 Cell: 082 415 7029 Tel: 034 328 0301	1 x CD
Department of Water & Sanitation	Attention: Ms. Zethu Makwabasa Southern Life Building 9th Floor 88 Joe Slovo Street Durban 4000 Tel: 031 336 2810	1 x hard copy
Newcastle Local Municipality	Attention: Mr. Shahil Singh Development Planning & Human Settlements 37 Murchison Street Newcastle CBD 2940 Tel: 034 328 7905	1 x hard copy 1 x CD
Amajuba District Municipality	Attention: Ms. Nothile Mthimkhulu Planning & Development Services Unit B9356, Section 1 Madadeni Newcastle 2951 Cell: 082 908 5764	1 x CD
Ezemvelo KZN Wildlife	Attention: Dominic Wieners Queen Elizabeth Park 1, Peter Brown Street Montrose Pietermaritzburg 3201 Tel: 033 845 1999	1 x hard copy 1 x CD

All registered interested and affected parties have been notified of the availability of the report, and how they can access both the electronic and hard copy (refer to **Appendix F6** for the notification letter). Parties wishing to comment are required to do so in writing within 30 days from the date of the notice.

7.3.1 Comments on the Draft BAR

All the comments received following the 30 days review period of the draft BAR will be incorporated and responded to in the Comments and Response Report to be attached as **Appendix F7**. No comments have been received to date.

7.4 Final Basic Assessment Report

The final Basic Assessment Report, which reflects all comments received from I&APs, will be made available for review within the regulated 30 days timeframe. All registered stakeholders and I&APs will be notified as soon as the report is ready for review. Parties wishing to comment will be required to do so in writing before the end of the review period (30 days). Any comments received are to be directed to the competent authority (DFFE) with ILA copied in all the correspondence.

SECTION 8: IMPACT ASSESSMENT & MITIGATION MANAGEMENT

This section assesses all the potential environmental impacts identified and the proposed impact management measures based on the impact management hierarchy. Impacts are the changes in an environmental parameter that result from undertaking an activity. The change is the difference between the effect on the environmental parameter where the activity is undertaken compared to that where the activity is not undertaken. Impacts occur over a specific period and within a defined area.

8.1 Impact Rating Methodology

The methodology used in the rating of significance of impacts is in terms of the DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria. The information series defines the determination of significant impacts as relating to the degree of change in the environmental resource, measured against some standard or threshold. This requires a definition of the magnitude, prevalence, duration, frequency, and likelihood of potential change. A threshold represents that point at which a project's potential environmental effects are considered significant. It's thus defined as a quantitative or qualitative standard or set of criteria against which the significance of a given environmental effect may be determined.

According to the Information Series, the framework for relating issues to significant impacts involves (1) analysing the significance of issues, (2) ascribing priorities to impacts, (3) estimating the probability of occurrence, and (4) screening for thresholds of concern.

An environmental issue is considered significant if there is a high probability that one or more impacts connected with that issue would exceed a threshold in one of the top three priorities. However, it should be noted the process of determining the significance of one or more impacts is ultimately a judgement call. However, the method proposed by Haug et al. (1984) attempts to make the process more systematic by displaying information related to specific issues in a standard and transparent format. In this way, judgemental factors can be applied more rigorously and consistently. Therefore the significance of an impact is evaluated as the product of a probability rating and a severity rating. A detailed description of the mentioned methodology follows:

Significance

Significance is the product of **probability** and **severity**.

Probability (P)

Probability describes the likelihood of the impact actually occurring, and is categorised and rated as follows:

Category	Definition	Rating
High Likelihood	Greater than 50:50 chance of occurrence ($P > 0.5$)	3
Low Likelihood	Less than or equal to a 50:50 chance, but at least 1:20 chance of occurrence ($P < 0.5$ but $> 1:20$)	2
Negligible	Less than 1:20 chance of occurrence ($P < 0.05$)	1

SPATIAL EXTENT (SE)

Describes whether impacts are limited in extent or affect a wide area or group of people e.g. site specific, local, regional, national, or international.

Rating	Extent	Spatial factor
High	Widespread, and far beyond site boundary. Regional / national / international scale	3
Medium	Beyond site boundary. Local area.1	2
Low	Within site boundary	1

Severity Rating (SR)

The **severity rating** is calculated from the *factors* allocated to **intensity** and **duration**. Intensity and duration factors are awarded to each impact, as described below.

Intensity Factor (IF)

The **intensity factor** is awarded to each impact according to the following method:

Biophysical Environment: Intensity can be considered in terms of the sensitivity of the biodiversity receptor (i.e. habitats, species, or communities).

Rating	Intensity	Intensity Factor
High	Disturbance of pristine area that have important conservation value. Destruction of rare or endangered species.	3
Medium	Disturbance of areas that have potential conservation value or are of use as resources. Complete change in species occurrence or variety.	2
Low	Disturbance of degraded areas, which have little conservation value. Minor change in species occurrence or variety.	1

Socio-economic Environment: Intensity can be considered in terms of the ability of people/communities affected by the Project to adapt to changes brought about by the Project.

Rating	Intensity	Intensity Factor
High	Affected people/communities will not be able to adapt to changes or continue to maintain-pre impact livelihoods.	3
Medium	People/communities are able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support.	2
Low	People/communities are able to adapt with relative ease and maintain pre-impact livelihoods	1

Duration (D)

Duration to determine whether the duration of the impact is short terms (0 to 5 years), medium term (5 to 15 years), or long terms (more than 15 years, with the impact ceasing after the operational life of the development) or considered permanent.

Rating	Duration	Duration Factor
High (Long term)	Permanent. Beyond decommissioning. Long term (more than 15 years)	3
Medium (Medium term)	Reversible over time. Lifespan of the project. Medium term (5 - 15 years)	2
Low (short term)	Quickly reversible. Less than the project lifespan. Short term (0 – 5 years)	1

Mitigatory Potential (MP)

For each impact, mitigation objectives that would result in a measurable reduction in impact are provided. Practical mitigation measures that can affect the significance rating are recommended for each impact. Management actions that could enhance the condition of the environment (i.e. potential positive impacts of the proposed project) are identified.

Rating	Mitigation potential	Mitigation factor
High	High potential to mitigate negative impacts to the level of insignificant effects	1
Medium	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.	2
Low	Little or no mechanism to mitigate negative impacts.	3

Acceptability (A)

The level of acceptability often depends on the stakeholders, particularly those directly affected by the proposed project. Ratings used for acceptability are given below.

Rating	Acceptability	Acceptability Factor
High (Unacceptable)	Abandon project in part or in its entirety. Redesign project to remove or avoid impact.	3
Medium (Manageable)	With regulatory controls. With project proponent's commitments	2
Low (Acceptable)	No risk to public health	1

Certainty (C)

Describes the degree of certainty of the impact actually occurring as unsure, possible, probable, or definite (impact will occur regardless of prevention measures).

Rating	Degree of certainty	Certainty Factor
Definite	More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.	3
Probable	Over 70% sure of a particular fact or of the likelihood of that impact occurring. Possible: Only over 40% sure of a particular fact or of the likelihood of an impact occurring.	2
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.	1

SEVERITY RATING (SevR)

The **severity rating** is obtained based on the following formula:

$$SevR = Probability + Spatial Extent + Intensity Factor + Duration$$

TABLE 1: SEVERITY RATINGS

RATING	FACTOR
Low Severity (Rating 2)	Calculated values 2 to 4
Medium Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High severity (Rating 5)	Calculated values 13 to 16
Severity factors below 3 indicate no significant impact	

SIGNIFICANCE RATING (SigR)

A **Significance Rating** is calculated as follows:

$$SigR = Severity Rating (Mitigatory Potential + Acceptability + Certainty)$$

The significance of impacts of the proposed development is assessed both with and without mitigation as follows:

Impact Magnitude & Significance Rating		Calculated significance rating
High (H)	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.	79 - 111
Medium (M)	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible. Social,	45 - 78

	cultural, and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost, and effort.	
Low (L)	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective, and less time-consuming.	12 - 44

8.2 Impact Assessment & Management

This section assesses, based on the above impact rating methodology, the potential environmental impacts identified under Section 6. Impact management is a process of identifying alternative ways or solutions for mitigating adverse impacts and optimising positive impacts.

NEMA and the EIA Regulations call for a hierarchical approach to impact management.

- ✚ Firstly, alternatives must be investigated to avoid negative impacts altogether.
- ✚ Secondly, after it has been found that the negative impacts cannot be avoided, alternatives must be investigated to reduce (mitigate and manage) unavoidable negative impacts.
- ✚ Thirdly, alternatives must be investigated to remediate (rehabilitate and restore).
- ✚ Fourthly, unavoidable impacts that remain after mitigation and remediation must be compensated for through investigating options to offset the negative impacts.
- ✚ While throughout, alternatives must be investigated to optimise positive impacts.

In this regard, the EIA Regulations, 2014 (as amended) states that the purpose of the EIA regulations is “... to regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities in order to avoid detrimental impacts on the environment, or where it cannot be avoided, ensure mitigation and management of impacts to acceptable levels, and to optimise positive environmental impacts, and for matters pertaining thereto.”

Cumulative impacts are defined as impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The identified potential environmental impacts are anticipated to occur mainly during the construction and operational phases of the proposed substation development.

8.2.1 Construction Phase

The nature or type of environmental impacts associated with the construction activities of the proposed substation is similar in terms of impact significance for both the preferred and alternative sites. The only difference between both sites is the highly sensitive wetland area to the north of the preferred site. In this regard, the potential environmental impacts assessed hereunder are for both the preferred (SS1) and alternative (SS2) sites.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
<p>Ecological disturbances</p> <ul style="list-style-type: none"> ▪ Loss of secondary grassland and related ecosystem services; ▪ Disturbance of grassland habitats; ▪ Degradation (changes in composition, structure or functioning) of the secondary grassland area; ▪ Loss of connectivity in landscape ecological and morphological processes; and ▪ Modification of the wetland hydrology and ecological functioning due to construction activities; ▪ Consequent decline or loss in the provision of ecosystem services; 	<p>Negative</p>	<ul style="list-style-type: none"> ✚ A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; ✚ The wetland and its buffer situated north of the proposed development site is a highly ecologically sensitive area and must be demarcated as a no-go area prior to the commencement of any construction activities. ✚ The construction camp must be fenced-off prior to commencement of any construction activities. ✚ Vegetation clearance to be limited to within the demarcated site boundary, and to be conducted under the supervision of the appointed Environmental Control Officer (ECO). ✚ The ECO should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. ✚ The hunting or snaring of animals is strictly prohibited and signage to that effect should be erected at a visible location 	<p>P – 3, SE – 1, IF – 2, D – 1, SR – 7, MP – 1, A – 2, C - 2</p> <p>35 - Low</p>	<p>P – 3, SE – 2, IF – 3, D – 2, SR – 10, MP – 3, A – 2, C - 3</p> <p>80 - High</p>

		<p>within the construction site.</p> <ul style="list-style-type: none"> ✚ Alien and invasive vegetation must not be allowed to further colonise the area, and all new alien vegetation recruitment must be sustainably eradicated or controlled. Control involves killing the alien invasive plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. The control of these species should even begin prior to the construction phase considering that small populations of the alien and invasive vegetation occur around the sites. 		
<p>Inadequate stormwater drainage or control</p> <ul style="list-style-type: none"> ○ Damming of stormwater on the construction site; ○ Stormwater contamination or pollution; ○ Soil erosion and sedimentation. 	<p>Negative</p>	<ul style="list-style-type: none"> ✚ The Site Engineer must design a construction site stormwater management plan to be implemented by the contractor for the duration of the construction phase. The plan must include appropriate design measures for: <ul style="list-style-type: none"> ▪ diverting run-off away from the construction site; ▪ minimising any potential soil erosion; ▪ dissipating the velocity of concentrated run-off in drainage channels prior to discharge downgradient; ▪ promoting the infiltration of stormwater discharge downgradient. ✚ All the stormwater from the construction site must be channelled into the existing drainage channel along the Road D1334. All the temporary stormwater drainage channels on site must be protected from erosion, and proper sedimentation control measures implemented at the lowest discharge point. The following sediment control measures are recommended where practical: <ul style="list-style-type: none"> ▪ Sediment filters: use materials such as fine mesh or geofabric to filter run-off prior to discharge. ▪ Sediment traps: temporary sedimentation basins. ▪ Drop inlet filters: e.g. hay bales and silt fences, which prevent sediment entry into the drainage system. ✚ Stormwater flowing towards the construction site must be diverted by means of berms and cut-off channels to prevent any potential contamination with construction related waste, oil spillages, or cement mixtures. Any contaminated run-off from the construction site must be diverted into a properly lined detention pond. ✚ Protect exposed surfaces susceptible to erosion and ensure that there is no undue soil erosion resultant from activities 	<p>P – 3, SE – 1, IF – 1, D – 2, SR – 7, MP – 2, A – 1, C - 3</p> <p>42 – Low</p>	<p>P – 2, SE – 2, IF – 3, D – 3, SR – 10, MP – 2, A – 2, C - 3</p> <p>70 - Medium</p>

		<ul style="list-style-type: none"> within and adjacent to the construction camp and Work Areas. ✦ Co-ordinate Works to limit unnecessarily prolonged exposure of stripped areas and stockpiles. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/ earthworks in that area. 		
Potential soil and groundwater contamination from construction related activities	Negative	<ul style="list-style-type: none"> ✦ No mixing of cement or concrete on bear ground. The designated cement mixing area must be generally flat and bermed-off to prevent any run-off. ✦ Oil spill kits to be readily available on site. ✦ All storage tanks containing hazardous materials must be placed in bunded containment areas with an impervious surface. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material. ✦ Any contaminated soil during construction should be immediately removed and disposed in marked waste skips depending on the physico / chemical properties of the contaminants. ✦ Oil spillages must be immediately removed by means of a spill kit and handled/stored, and disposed as hazardous waste. 	<p>P – 3, SE – 1, IF – 1, D – 2, SR – 7, MP – 2, A – 1, C - 3</p> <p>42 – Low</p>	<p>P – 3, SE – 2, IF – 3, D – 2, SR – 10, MP – 3, A – 2, C - 3</p> <p>80 - High</p>
Potential increase or spread in alien and invasive plants	Negative	<ul style="list-style-type: none"> ✦ All the alien and invasive weeds identified by the Ecological specialist must be controlled or eradicated as prescribed in the Alien and Invasive Control Plan (AICP) attached in the EMP. The AICP should be implemented by a qualified professional. No chemical control of AIPs to occur without the use of registered herbicides and a trained professional. ✦ Removal of alien and invasive weeds should preferably commence during the pre-construction phase and continue throughout the construction and operational phases. These should be cleared within the study area before any vegetation clearing activities commence, thereby ensuring that no alien or invasive weed propagules are spread, or soils contaminated with alien and invasive seeds during the construction phase; ✦ Institute strict control over materials brought onto site, which should be inspected for seeds of noxious plants and steps taken to eradicate these before transport to the site. Routinely fumigate or spray all materials with appropriate low-residual herbicides prior to transport to or in a quarantine area on site. ✦ The contractor is ultimately responsible for the control of 	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C - 2</p> <p>25 - Low</p>	<p>P – 3, SE – 1, IF – 2, D – 1, SR – 7, MP – – 1, A – 2, C - 2</p> <p>35 - Low</p>

		<p>weeds and invader plants within the construction site for the duration of the construction phase.</p> <ul style="list-style-type: none"> ✦ Reinststate all disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. ✦ Prohibit the use of fill materials from areas with known invasive vegetation problems. The spread of invasive non-native plants should be avoided by keeping vehicles and equipment clean and reseeding disturbed areas with endemic plants. ✦ Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. ✦ Cleared weeds/exotic invader species must be discarded at garden waste disposal facilities. 		
<p>Potential Geotechnical constraints</p>		<ul style="list-style-type: none"> ✦ All structural foundations and wet services must be designed and constructed according to the Eskom's Geotechnical specifications and requirements, and in terms of the relevant SANS specifications. ✦ The final structural designs must be approved by a registered professional Geotechnical Engineer. ✦ The appointed Bulk Earthworks engineer must be briefed on the potential Geotechnical risks and appropriate mitigation measures required prior to the commencement of any works on site. ✦ Earthwork and/or foundation and structural modifications will be necessary in order to limit differential movements and unwanted damage to foundations/structures. ✦ Considering the general site slope, some cut-to-level and/or cut-to-fill-to-level earthwork preparation may be required. ✦ Localised rehabilitation of soils and/or earthwork and/or foundation modifications will be required where and if proposed structures span historic foundations and/or underground services. ✦ Depending on the pipe specifications to be considered for sewer and water reticulation, suitable pipe bedding and blanketing material may have to be imported. 	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C - 2</p> <p>25 - Low</p>	<p>P – 3, SE – 2, IF – 2, D – 1, SR – 8, MP – – 1, A – 3, C - 3</p> <p>56 - Medium</p>

<p>Potential traffic disruption and damage to existing external roads</p>	<p>Negative</p>	<ul style="list-style-type: none"> ✦ Clear and visible signs warning motorists of turning construction vehicles must be displayed at the intersection between Madadeni Road (P438) and Road D1334. ✦ The KZN Department of Transport should be consulted on the proposed traffic control or calming measures for traffic accessing the construction site via Madadeni Road (P438). ✦ The main contractor must comply with the KZN Department of Transport and Amajuba District Municipality requirements for the maintenance of the existing access roads, and to also ensure the sub-contractors comply the same. ✦ Details of the project name and appointed main contractor including contact details of the project team and completion dates should be displayed at the main entrance of the construction site. ✦ Applicable traffic warning and regulatory signage should be erected at visible locations along the district road. ✦ The main contractor must ensure all construction vehicles accessing the site only utilise the designated route and access to the site. ✦ Vehicles may not leave the designated roads and tracks and turnaround points will be limited to specific sites. ✦ The main contractor must maintain all access routes and roads adequately in order to minimise erosion and undue surface damage. Repair rutting and potholing and maintain storm water control mechanisms. ✦ Enforce speed limits at all times on all external access roads. Unless otherwise specified, the maximum speed limit on construction roads is 40km/h. ✦ Allow for safe pedestrian, livestock, and cycling access and crossing particularly along Madadeni Road (P438). ✦ Ensure adequate and appropriate warning signage for construction vehicles turning at the main entrance/exit. ✦ Traffic controllers must be positioned at strategic points along the access road to ensure minimum disruption of traffic by construction vehicles. 	<p>P – 3, SE – 1, IF – 2, D – 1, SR – 7, MP – 1, A – 2, C – 2</p> <p style="text-align: center;">35 - Low</p>	<p>P – 3, SE – 2, IF – 1, D – 1, SR – 7, MP – 2, A – 2, C – 3</p> <p style="text-align: center;">49 - Medium</p>
<p>Noise and dust pollution during construction activities</p>	<p>Negative</p>	<ul style="list-style-type: none"> ✦ Noise should be kept minimal at all times during construction. The use of heavy machinery with high noise frequency or vibration should be limited as much as possible. No use of machinery, apparatus, engine, or tool which may 	<p>P – 2, SE – 1, IF – 1,</p>	<p>P – 3, SE – 1, IF –</p>

		<p>unreasonably disturb or interfere with the amenity of the surrounding residents shall be allowed:</p> <ul style="list-style-type: none"> ▪ on a public holiday or Sunday; or ▪ before 06:00 or after 17:00 on any Saturday; and ▪ before 06:00 or after 18:00 on any day other than those days mentioned above. <ul style="list-style-type: none"> ✦ A programme should be developed prior to construction for drilling and blasting operations. The programme should be communicated to all the surrounding residents within a 500m radius from the blasting or drilling area. All drilling blasting operations must follow the programme and should be restricted to working hours only. ✦ Dust emissions must be kept minimal at all times during construction, and dust suppression measures such as water spraying should be implemented regularly along the main gravel access road (D1334) and on areas of the construction site associated with high dust emissions. ✦ The dust fall rates from blasting operations should be kept within acceptable dust fall rates limit (<600 mg/m²/day, 30-days average) published in the National Dust Control Regulations, 2013. ✦ Unless otherwise specified, construction works to be limited to Monday to Friday between 06:00 – 18:00 and on Saturdays between 07:00 – 15:00. No construction work to be undertaken on Sundays and Public Holidays in order to minimise the disturbance caused by noise emanating from the construction site. ✦ Construction vehicles with mud laden tyres from the construction site should be cleaned prior exit to prevent or minimise mud deposits on Madadeni Road (P438). ✦ Madadeni Road should be kept clean at all times and free of dust emanating from the construction site. ✦ Dispersive material in trucks entering or exiting the construction site should be dampened or covered; ✦ Access by heavy machinery where there no access roads exist should be restricted as much as possible. 	<p>D – 1, SR – 5, MP – 1, A – 2, C - 2</p> <p style="text-align: center;">25 - Low</p>	<p>1, D – 1, SR – 6, MP – 1, A – 2, C – 3</p> <p style="text-align: center;">36 - Low</p>
<p>Improper or inadequate management of construction</p>	<p>Negative</p>	<ul style="list-style-type: none"> ✦ No construction waste must be dumped in surrounding open areas, and any contractor or sub-contractor found guilty of illegally dumping construction waste on the surrounding open space areas will be penalised and liable for removing and 	<p>P – 3, SE – 2, IF – 2,</p>	<p>P – 3, SE – 2, IF –</p>

<p>waste</p> <ul style="list-style-type: none"> ○ Dumping of construction waste in surrounding open space areas or vacant land; ○ Non-separation of waste; ○ Pollution and safety risks due to negligence in the storage of hazardous waste; ○ Environmental health risks due to poor housekeeping and lack of adequate sanitation. 		<p>remediating any contamination caused.</p> <ul style="list-style-type: none"> ✦ All building waste generated during construction must be reused or taken for recycling, with disposal as the last option. Construction rubble that cannot be reused on the construction site can be used to fill up pot holes along the gravel access road. ✦ A suitable flat area must be designated for the temporary storage of all waste material generated from construction activities on site. Appropriate measures should be taken to divert stormwater away from the waste storage area. ✦ None re-usable/recyclable building rubble and solid material must be disposed at a registered waste facility. ✦ The contractor must ensure all waste disposal certificates are kept on file for record purposes and as proof should these be required. ✦ Littering is strictly prohibited and appropriate receptacles should be made available within the construction site. ✦ Domestic waste generated on site during construction to be collected in waste skips. Waste skips containing food waste must be covered. ✦ Adequate on-site chemical sanitation systems (one toilet for every 8 workers) must be provided within walking distance to all construction workers. Strict penalties in re-numeration must be applied to workers that use other surrounding open areas for this purpose. ✦ Solid construction waste not posing a pollution hazard should be used on site as backfill or aggregate material as much as possible. Should no backfilling material be required, this waste should either be taken to a recycling facility or disposed-off at a registered landfill site. ✦ The burning of litter or waste on site is strictly prohibited. ✦ Litter patrols must be conducted at least once a week to ensure the site as well as the property is kept free of litter. ✦ Waste shall be separated into recyclable and non-recyclable waste. The waste receptacle should be clearly marked for ease of separation. ✦ The contractor must adhere to all the relevant laws and regulations applicable to the disposal of construction waste and rubble. ✦ The contractor shall provide sufficient closed containers on 	<p>D – 1, SR – 8, MP – 1, A – 1, C – 2</p> <p>42 – Low</p>	<p>2, D – 1, SR – 8, MP – 1, A – 3, C – 3</p> <p>56 - Medium</p>
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		<p>site, as well as waste skips, which must be placed inside the construction camp, to handle the amount of litter, wastes, and builder's wastes generated on site.</p> <ul style="list-style-type: none"> ✚ Waste containers should be emptied at least twice a week by a licensed waste services provider for recycling at a licenced waste management facility, or disposal at a licenced landfill site. No solid waste or any materials used may be disposed of on site. ✚ No rubble or discarded building material should be stockpiled at a non-designated area within the construction site for more than a week. ✚ A suitable area free from run-off must be designated for mixing of concrete or cement with an impervious surface such as a concrete slab, metal or plastic sheeting. ✚ Contain water and slurry from cement and concrete mixing operations as well as from batching area wash bays. Direct such waste water into a settlement or detention pond for later removal and disposal at a licenced landfill site. ✚ Hazardous liquid waste mainly comprising of used oil, contaminated fuel, and lubricants, as well as used paint etc. must be collected in original containers and stored inside a surfaced or bunded storage area. The bunded surface area volume should be equal to 110% of the total volume of liquid stored. ✚ All hazardous solid and liquid waste to be disposed of at a class H:H licenced landfill site only. ✚ Fresh concrete spills outside the designated areas must be promptly removed by the Contractor and disposed in the appropriately marked waste skip. ✚ No concrete residue is to be washed off into rivers, streams, or wetlands. 		
<p>Potential damage to subsurface, palaeontological, archaeological or historical material, or burials unearthed during construction</p>	<p>Negative</p>	<ul style="list-style-type: none"> ✚ All the recommendations made by the Heritage Specialist in the Cultural Heritage Impact Assessment Report attached as Appendix E2 should be adhered to during the construction phase. ✚ Should any subsurface palaeontological, archaeological, cultural, or historical material, or burials be exposed during construction activities, all activities must be suspended and the archaeological specialist notified immediately. ✚ Should human remains be exposed at any stage, all 	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C – 2</p> <p>25 - Low</p>	<p>P – 3, SE – 2, IF – 1, D – 1, SR – 7, MP – 2, A – 2, C – 3</p> <p>49 - Medium</p>

		<p>construction activities must cease immediately pending an evaluation by the heritage authorities An Archaeological Specialist in human remains should be appointed to advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.</p> <ul style="list-style-type: none"> ✦ Should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA or KZN-Amafa Institute) must be notified immediately so that the appropriate action can be taken by a professional palaeontologist. 		
<p>Job creation and business opportunities for local businesses in the construction sector</p>	<p>Positive</p>	<ul style="list-style-type: none"> ✦ Direct and indirect jobs and business opportunities will be created during the construction phase. Businesses in the material supply chain should also benefit. ✦ Principal Contractor (PC) must establish a local SMME recruitment preference policy; ✦ Implement a monitoring system to ensure that the project honours the local SMME preference policy; ✦ The PC must appoint a Community Liaison Officer (CLO) from the local community; ✦ The CLO will be responsible, amongst other duties, for ensuring people from the nearby communities especially with disadvantaged backgrounds are given preference as far as reasonably possible in the recruitment processes. This should be included as a contractual obligation in the main contractor's appointment. ✦ PC should develop labour community agreement with targets and employment to be included in the procurement policy and procedures. ✦ PC to ensure that the Labour Relations Amendment Act, 2002 (Act 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures. 	<p>P – 3, SE – 2, IF – 2, D – 2, SR – 9, MP – 1, A – 2, C – 3</p> <p>54 – Medium</p>	<p>P – 3, SE – 2, IF – 2, D – 1, SR – 8, MP – 1, A – 1, C – 2</p> <p>42 – Low</p>

Employment opportunities for the unskilled and semi-skilled resulting in the reduction in poverty levels	Positive	<ul style="list-style-type: none"> ✚ The local historically disadvantaged communities must be given preference in the recruitment of unskilled and semiskilled labour. ✚ The PC must ensure all the unskilled and semiskilled workers are provided opportunities to train on the job and to work with skilled personnel. 	Medium	Low
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Preferred & alternative powerline route

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
<p>Ecological disturbances</p> <ul style="list-style-type: none"> ▪ Loss of connectivity in landscape ecological and morphological processes; ▪ Modification of the wetland hydrology and ecological functioning due to construction activities; ▪ Consequent decline or loss in the provision of ecosystem services; 	Negative	<ul style="list-style-type: none"> ✚ A construction method statement must be provided by the Principal Contractor, prior to any construction activities, indicating the following: <ul style="list-style-type: none"> ▪ Access routes; ▪ Construction footprint size; ▪ List of construction machinery to be used; ▪ Duration of construction; ▪ Construction method; ▪ Number of construction workers; ▪ Proposed mitigation measures; and ▪ Proposed rehabilitation method. ✚ All construction activities in the wetland area and its buffer must be conducted according to the following requirements: <ul style="list-style-type: none"> ▪ Conditions of the <i>General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water Uses as defined in Section 21(c) or Section 21(i)</i>, published in Government Notice 509 of 2016. ▪ Recommendations made by the Department of Water and Sanitation (if any). ▪ Environmental Management Programme (EMPr) attached as Appendix G. ✚ Photos of the baseline wetland conditions must be taken prior 	<p>P – 2, SE – 2, IF – 3, D – 3, SR – 10, MP – 2, A – 2, C - 3</p> <p>70 - Medium</p>	<p>P – 3, SE – 2, IF – 3, D – 2, SR – 10, MP – 3, A – 2, C - 3</p> <p>80 - High</p>

		<p>to the commencement of any construction activities. The photos should be filed and kept for future reference during the rehabilitation process.</p> <ul style="list-style-type: none"> ✦ Construction activities through the wetland area should be scheduled during the dry season (June - August) to avoid working in flooded and marshy conditions ✦ The wetland area must be rehabilitated to its near baseline condition after construction. The appointed ECO will monitor the rehabilitation process. ✦ Vegetation clearance to be limited to within the demarcated site boundary, and to be conducted under the supervision of the appointed Environmental Control Officer (ECO). ✦ The ECO should advise the construction team in all relevant matters to ensure minimum destruction and damage to the wetland. Regular environmental awareness should be provided to construction workers working in the wetland area to ensure the protection of the hydrological and ecological functioning of the wetland. ✦ Alien and invasive vegetation must not be allowed to further colonise the area, and all new alien vegetation recruitment must be sustainably eradicated or controlled. Control involves killing the alien invasive plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. The control of these species should even begin prior to the construction phase considering that small populations of the alien and invasive vegetation occur around the sites. 		
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8.2.2 Operational phase

There are no major environmental impacts associated with the operational phase. Most of the environmental impacts are negligible in terms of impact significance and can be effectively mitigated.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Damage to the substation equipment due to potential lighting or fire	Negative	<ul style="list-style-type: none"> ✦ Although transformer fires and explosions are highly unlikely under normal weather conditions, they can potentially occur due to design faults, faulty hardware, or an overload in the system. Sudden damage to transformers can also lead to overcharging, which can create sufficient quantities of heat and sparks to ignite the mineral oil. A lightning strike can damage wires and/or equipment and cause too much electricity to flow into the transformer, leading to fire and/or explosion. ✦ All the possible fire hazards must be identified and appropriate design and operational measures be incorporated to minimise or prevent any fire risks in line with Eskom, SANS, and any applicable international standards or specifications. ✦ Appropriate fire warning signage must be displayed at the entrance of the substation and all high fire risk areas or equipment inside the substation, ✦ Appropriate and sufficient fire fighting equipment that meets the required SANS specifications must be available at designated points inside the substation. ✦ No unauthorised personnel inside the substation. ✦ No smoking inside the substation. ✦ Lightning protection measures such as the installation of appropriate lightning conductors must be incorporated in the design of the substation as per SANS or Eskom specifications. ✦ The possibility of installing an early warning fire alarm system should be taken into consideration during the operational phase. 	<p>P – 2, SE – 2, IF – 3, D – 3, SR – 10, MP – 2, A – 2, C - 3</p> <p>70 - Medium</p>	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C - 2</p> <p>25 - Low</p>

		<ul style="list-style-type: none"> ✦ Fire breaks must be maintained around the perimeter of the substation. 		
Contamination of surface and groundwater resources due to potential overflow or leakage of oil contaminated stormwater from the transformer oil holding dam	Negative	<ul style="list-style-type: none"> ✦ The oil holding dam must be designed, constructed, and maintained according to the relevant engineering specifications, guidelines, and standards. ✦ The design capacity of the holding dam must be sufficient enough to cater for any 1 in 24-hour rainfall event with a minimum freeboard level of 0.8 m above full supply level. ✦ A secondary dam should be incorporated in the design to cater for any potential overflow. ✦ The holding dam must be regularly checked for structural integrity. Any cracks or structural defects must be immediately repaired. 	<p>P – 2, SE – 2, IF – 3, D – 3, SR – 10, MP – 2, A – 2, C - 3</p> <p>70 - Medium</p>	<p>P – 3, SE – 2, IF – 3, D – 2, SR – 10, MP – 3, A – 2, C - 3</p> <p>80 - High</p>
Erosion along the verges of the V-drains and downstream of the outlet structure Sedimentation downstream	Negative	<ul style="list-style-type: none"> ✦ All areas vulnerable to erosion must be protected from further denudation by installing appropriate erosion protection material such as gabion baskets and rip-rap. ✦ All open areas around the substation must be grassed particularly on embankment slopes and in open drainage channels. ✦ The grass must be regularly cut and de-weeded to prevent the proliferation of alien and invasive weeds. ✦ Only approved herbicides and soil poisoning chemicals must be used by registered and professional agents/contractors. ✦ All stormwater infrastructure must be regularly inspected and repaired for structural damage or cracks. ✦ The immediate area around the outlet structure and further downstream must be grassed and regularly de-sedimented. 	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C - 2</p> <p>25 - Low</p>	<p>P – 3, SE – 2, IF – 1, D – 1, SR – 7, MP – 2, A – 2, C - 3</p> <p>49 - Medium</p>
Disturbance of birds Collision of birds with overhead wires Electrocution of birds	Negative	<ul style="list-style-type: none"> ✦ Should any incidences of collision with the Tee-lines be reported, suitable line marking devices should be installed as a remedial measure immediately. ✦ Any birds found dead within 50 m on either side of the power line must be reported to Eskom, BirdLife South Africa, and Ezemvelo KZN Wildlife. ✦ The grid connection power line must be incorporated into the on-going operational management programme of the existing Parklands-Vlaklaagte 132kV powerline. ✦ The full length of the grid connection must be checked approximately every two months for mortalities, throughout the lifespan of the facility. ✦ Bird diverters should be placed on all sections of powerline 	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C - 2</p> <p>25 - Low</p>	<p>P – 3, SE – 2, IF – 2, D – 1, SR – 8, MP – 1, A – 3, C - 3</p> <p>56 - Medium</p>

		<p>that will pass over watercourses and wetlands.</p> <ul style="list-style-type: none"> ✦ Mark all sections of the overhead power-line with bird flight diverters (BFDs) as per standard Eskom guidelines. ✦ Flappers must be maintained and replaced where necessary, for the life span of the project ✦ Any collision incidents be reported to the BirdLife South Africa and Ezemvelo KZN Wildlife. ✦ No nests are to be removed, without first consulting a qualified Avifaunal Specialist. ✦ During maintenance, if any of the “Focal Species” or Red Data species listed in the Ecological report are observed to be roosting and/or breeding within a 200m corridor of the power line route servitude, a qualified Avifaunal specialist is to be contacted for further instruction. ✦ Only authorised persons should be allowed on site, and all vehicles must stay on designated roads/tracks. 		
Sewerage overflow from the septic tank	Negative	<ul style="list-style-type: none"> ✦ The proposed septic tank and soak away system must be designed and constructed according to <i>SANS 10400-Part P, Drainage, Plumbing, Sanitation, and Water Disposal</i> specifications, and Water & Sanitation municipal by-laws. ✦ The septic tank and soak away system must be regularly maintained and checked for blockages. ✦ Appropriate control measures should be implemented to prevent the ingress of stormwater into the system. 	<p>P – 2, SE – 1, IF – 1, D – 1, SR – 5, MP – 1, A – 2, C – 2</p> <p>25 - Low</p>	<p>P – 3, SE – 1, IF – 1, D – 1, SR – 6, MP – 1, A – 2, C – 3</p> <p>36 - Low</p>

8.2.3 No-Go Option

There are no benefits associated with this option as the wetland area and its buffer are already under threat of further degradation due to the rapidly spreading development in the area with half of the wetland to the north east of the development site, already degraded.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Further degradation of the development site through infestation of alien and invasive plant species	Negative	<ul style="list-style-type: none"> ▪ The landowner should appoint a qualified Ecological specialist to compile a site-specific Alien and Invasive Species (A&IS). Control Plan. ▪ All alien and invasive species identified on the property to be eradicated and or controlled 	<p>P – 3, SE – 2, IF – 2, D – 2, SR – 9, MP – 1, A – 2, C – 3</p> <p>54 – Medium</p>	<p>P – 3, SE – 2, IF – 3, D – 2, SR – 10, MP – 3, A – 2, C – 3</p> <p>80 - High</p>

		<p>according to the A&IS Control Plan.</p> <ul style="list-style-type: none"> Implement a strict monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. 		
Continued electricity capacity constraints and lack of security of supply	Negative	<ul style="list-style-type: none"> Eskom should engage all the stakeholders and local community in an effort to identify alternative and sustainable solutions for ensuring security of electricity supply in the area. 	P - 2, SE - 1, IF - 1, D - 1, SR - 5, MP - 1, A - 2, C - 2 25 - Low	P - 3, SE - 2, IF - 1, D - 1, SR - 7, MP - 2, A - 2, C - 3 49 - Medium
Reduced adverse impact and potential restoration of the wetland through rehabilitation	Positive	<ul style="list-style-type: none"> The wetland area and its buffer must be fenced by the landowner and no development is to be permitted within the demarcated wetland buffer. The landowner should appoint a professional and registered Wetland Specialist to compile a Wetland Rehabilitation Plan. All the disturbed areas of the wetland must be rehabilitated according to the Wetland Rehabilitation Plan. Alternative site options elsewhere will have to be considered in identifying a suitable site for the proposed substation. Only degraded or transformed areas not situated near any environmental sensitivities should be considered as possible site options. 	P - 3, SE - 2, IF - 3, D - 2, SR - 10, MP - 2, A - 2, C - 3 70 - Medium	P - 3, SE - 2, IF - 2, D - 1, SR - 8, MP - 1, A - 1, C - 2 42 - Low

SECTION 9: ASSUMPTIONS, UNCERTAINTIES, AND GAPS

The following assumptions, uncertainties, and gaps in knowledge are applicable:

1. The Ecological Report by G.J McDonald attached hereto as **Appendix E1** was conducted as part of the original application in 2014. Although the report is older than 5 years and was undertaken prior to the promulgation of the species protocols, it serves as a site sensitivity verification for the environmental sensitivities identified in the DFFE Screening Report.
2. Detailed information on the Geotechnical characteristics of the soils is not yet available and unknown at this stage.
3. It is assumed Rehabilitation will be conducted according to Eskom guidelines and standards.
4. All the proposed infrastructure will be designed, constructed, and maintained in accordance with the approved Eskom norms and standards, and SANS specifications where applicable.

SECTION 10: ENVIRONMENTAL IMPACT STATEMENT

It is important to note that the broader study area has experienced significant transformation in the form of urbanisation which dominate the landscape and fairly significant levels of disturbance persist within the study area in the form of settlements and urban related activities in the immediate surrounds. Both the preferred and alternative sites for the substation are already transformed due to historical cultivation and currently under pressure of being developed for housing due to the surrounding edge effects.

The environmental impacts associated with the construction of the proposed substation on both the preferred and alternative development sites are therefore similar in terms of type, probability, intensity, magnitude, and more importantly, significance. Overall, the construction of the proposed substation will result in environmental impacts of high to medium significance without mitigation, and low to medium significance with mitigation. The impacts of high significance are mainly associated with the sensitive wetland area to the far north of the preferred development site. This wetland area is the lowest gradient point and any construction activities on the preferred development site will have an indirect and direct impact on the hydrological functioning and ecological integrity of the wetland. In addition, the proposed stringing of the loop-in and loop-out cables along the preferred and alternative route will have a direct impact on the wetland's hydrology and ecological functioning. However, all the construction related impacts are temporal and can be effectively mitigated provided the appointed main contractor strictly conforms to the EMPr requirements.

The environmental impacts associated with operational phase of the substation are moderate to low without mitigation, and extremely low with mitigation. The only likely impact of high significance (without mitigation) is potential surface and groundwater contamination from possible leakage or overflow of oil contaminated storm water in the transformer oil holding dam. However, the impact can be reduced to moderate significance if all the recommended mitigation measures are implemented. Another potential environmental concern is the management of stormwater during the operational phase as this will directly impact the wetland downgradient. It is important for the storm water drainage system to be well maintained, and monitored more regularly, to prevent any potential erosion and subsequent siltation of the wetland down gradient. Powerlines are known to be responsible for a number of negative impacts on birds, the most common being collision with the overhead wires and electrocution. Although the proposed activity will include the installation of additional overhead powerlines where they T-off from the existing utilities and enter the proposed new substation, as far as linear developments are concerned the additional spans involved (300m) are negligible. In terms of this proposed development the greatest impact on avifauna is likely to be habitat destruction and disturbance.

Although the preferred development site poses a significant threat to the hydrological and ecological functioning of the wetland compared to the alternative site for the substation, it is the best suitable option from a technical perspective. The site is easily accessible from the gravel road D1334 and situated in a safe distance from existing houses or settlements. The "no-go option" will inevitably result in the occupation of the site for housing development as the surrounding open areas have already been developed. The preferred powerline connection route is the best suitable option from an environmental and technical perspective as it will have minimal impact on the wetland area compared to the alternative route, and it follows a straight line thereby avoiding construction and operational costs associated with bends.

In light of the above, it is the reasoned opinion of the EAP that the proposed development of the substation on the preferred site, and associated construction of the loop-in and loop-out powerlines on the preferred route, will not have a deleterious impact on the existing biophysical and socio-economic environment provided all the mitigation measures recommended in this report and the attached EMPr are strictly implemented and monitored.

SECTION 11: CONCLUSION AND RECOMMENDATIONS

It is recommended the proposed substation development and associated infrastructure, as indicated on the site plan attached hereto as **Appendix C1**, be granted environmental authorisation subject to compliance with the following conditions:

1. All the recommendations and mitigation measures in this report and all specialist reports must be incorporated, where practical, in the final design and construction drawings.
2. The wetland buffer must be surveyed and demarcated as a sensitive area. This should be clearly indicated as “no-go area” on the Site Plan of the substation, and any activities in this area must be conducted upon approval of the Construction Method Statement by the appointed Environmental Control Officer (ECO).
3. All the mitigation measures in the EMPr proposed for the design, construction, and operational must be strictly implemented. An independent Environmental Control Officer should be appointed prior to the commencement of construction activities to monitor compliance during construction.
4. A SACNASP registered Ecological Specialist must be appointed to conduct a final survey of the site prior to any construction activities in order to identify potential flora and fauna species of conservation concern (SCC) that might have established on site since the last survey in 2014. A search and rescue should be conducted for any SCCs identified on the development site and powerline construction servitude. The necessary permits to conduct a search and rescue must be obtained from the Conservation Unit of the KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA).
5. The final detailed designs and building plans must be approved by the relevant authorities prior to commencement with construction activities.
6. All structural foundations including wet services must be designed and constructed according to the recommendations of the Geotechnical specialist and as required by the Council of Geoscience.
7. All structural and engineering services design to be approved by a suitably qualified Geotechnical Specialist prior to commencement with construction activities.
8. The architectural design of the buildings and associated structures should be conducted taking into consideration the aesthetic value of the area and potential visual impact.
9. The site should be regularly monitored for the presence of red listed flora and fauna during construction. Any fauna identified on site must be safely protected from any harm or danger and the ECO immediately notified.
10. The site must be demarcated prior to the commencement of any construction activities. The removal of vegetation should only be limited to within the demarcated area.
11. Construction vehicles accessing the site to use designated routes only.
12. The final Stormwater Management Plan should be designed according to Sustainable Drainage Standards that mimic the natural drainage conditions as practically as possible.
13. The new proposed access road and upgrade of the existing roads must be designed and constructed according to the district, municipal, and or provincial requirements.
14. External lighting for the substation to be designed taking into consideration the sensitivity of the surrounding environment to light pollution, particularly towards the wetland area.

SECTION 12: REFERENCES

1. Institute of Natural Resources (INR), 2019: Environmental Management Framework for the Amajuba District Municipality - Draft Environmental Sensitivity Zones and Assessment Guidelines
2. Ngidi D.(Ludloko Developments –LDK CC), 2014: Basic Assessment Report for the proposed Matsheketsheeni 132/88kv Substation and 132kv Loop-in and Loop-out Lines (DEAT Ref No. 14/12/16/3/3/1/1068)
3. McDonald G.J, Small CP, 2014: Specialist Ecological Final Report Prepared for Ludloko Developments - Proposed Matsheketsheeni 132kv Loop-In-Loop-Out Line and 132kv Substation
4. New Castle Local Municipality, June 2021: Community Based Plan Ward 06
5. Newcastle Local Municipality, May 2021: 4th Generation Integrated Development Plan (2017/18 – 2021/22) – Final IDP Review (2021/22)