agriculture, rural development, land & environmental affairs
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND REGULATION 16(1) AND 19 OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 (AS AMENDED).

NAME OF COMPANY	North Block Complex (Pty) Ltd
CONTACT PERSON	Mr Maleho Musi
PHYSICAL ADDRESS	Spitzkop Road, Portion 5 of Paardeplaats Farm 380 JT, Belfast, 1100
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QUALITY MANAGEMENT

Report Title	Basic Assessment Report: Proposed Realignment of the D 2809 Provincial Road.		
Project Number	CIG/ENVSOL/21/PROJ/0037		
	Draft Report	**Final Report**	**Revision 1**
Date	**29 July 2021**		
Author	Renee Janse van Rensburg		
Reviewed By	Jacques Harris		
Authorised By			

DISCLAIMER

Information contained in this report is based on information received from the client and other external sources. Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by CIGroup Environmental (Pty) Ltd (CIGroup) for incomplete or inaccurate data supplied by others. We are aware that there might have been project or operational changes since this report was submitted, however this report and its findings is based on the last information received from the client and/or the site visit undertaken. To the best of our knowledge the assumptions and findings are correct at the time of submission of the report. Should any of the assumption or findings prove to be incorrect subsequent to submission of the report we as the specialist cannot be held accountable. Note that whilst CIGroup has made every effort to obtain the correct information and to carry out an appropriate, independent, impartial and competent study, CIGroup cannot be held liable for any incident which directly or indirectly relates to the work in this document, and which may influence the client or on any other third party.

CONFIDENTIALITY

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DECLARATION OF INDEPENDENCE

CIGroup Environmental (Pty) Ltd (CIGroup), as the Environmental Assessment Practitioner specialists, were appointed to undertake an Environmental Authorisation (EA) application and Basic Assessment Process for the Proposed Realignment of the D 2809 Provincial Road. CIGroup does not have a vested interest in the proposed activity proceedings, will not engage in and have no conflicting interest in the undertaking of the activity. CIGroup has provided all information at their disposal regarding the Scoping Report, whether such information is favourable to the Client or not.

_____ 29 July 2021

Renee Janse van Rensburg Date

Environmental Compliance and Assessment Manager

CIGroup Environmental (Pty) Ltd

CONTENTS OF A BASIC ASSESSMENT REPORT (APPENDIX 1 OF THE 2014 EIA REGULATIONS)

SCOPE OF ASSESSMENT AND CONTENT OF BASIC ASSESSMENT REPORTS	SECTION OF REPORT
3. (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include- a) details of- i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae.	Section 2.2 & 2.3
b) 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 3
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 & Appendix B
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;	Section 4 & 5
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 6
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 7
g) a motivation for the preferred site, activity and technology alternative;	Section 8
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;	Section 8, 9, 10, 11, 12 & 13

SCOPE OF ASSESSMENT AND CONTENT OF BASIC ASSESSMENT REPORTS	SECTION OF REPORT
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 extent, duration, severity/intensity and certainty/probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; 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;	
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- i. a description of all environmental issues and risks that were identified during the environmental impact assessment process; and ii. an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 12 & 13
j) an assessment of each identified potentially significant impact and risk, including- i. cumulative impacts; ii. the nature, significance and consequences of the impact and risk;	Section 13

SCOPE OF ASSESSMENT AND CONTENT OF BASIC ASSESSMENT REPORTS	SECTION OF REPORT
iii. the extent and duration of the impact and risk; iv. the probability of the impact and risk occurring; v. the degree to which the impact and risk can be reversed; vi. the degree to which the impact and risk may cause irreplaceable loss of resources; and vii. the degree to which the impact and risk can be avoided, managed or mitigated;	
k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 13
l) an environmental impact statement which contains- i. a summary of the key findings of the environmental impact assessment; ii. a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 14
m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Section 13
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 16
o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 15
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 17
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;	Section 18
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	Section 20

SCOPE OF ASSESSMENT AND CONTENT OF BASIC ASSESSMENT REPORTS	SECTION OF REPORT
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	
s) ……..	Not applicable
t) any specific information that may be required by the competent authority; and	Section 19
u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable
(2) Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	Not applicable

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1 INTRODUCTION

North Block Complex (Pty) Ltd (NBC) consists of three (3) mining sections namely the Eerstelingsfontein Section, the Glisa Section, and the Paardeplaats Section. NBC are currently mining coal via opencast methods on Portion 30 of the Farm Paardeplaats 380 JT and intends to expand its opencast mining activities onto portion 13 and 29 of the Farm Paardeplaats 380 JT, which fall within the approved Mining Right (MP 30/5/1/2/2/10090 MR) area. In order to expand mining operations onto portion 13 and 29, NBC needs to permanently realign the existing D 2809 Provincial Road.

The D 2809 Provincial Road is located near eMakhazeni in the Mpumalanga Province and runs from the Siyathuthuka Road in a southerly direction until it reaches the N 4 toll road. The road is used by the general public, landowners, and workers accessing land along the road. The road falls within the approved Paardeplaats Section MR area. The responsibility for the road is currently vested with the provincial Department of Public Works, Roads and Transport (DPWRT). NBC has approached the DPWRT to undertake the realignment of the road, at their (NBCs) own cost and as approved by the DPWRT, with responsibility of the road after realignment remaining vested with the provincial DPWRT. The road is not a haul road and will not be used as a haul road. The road will remain a provincial road after realignment used the general public, landowners, and workers to access land along the road, including businesses, homesteads, and schools.

In order to undertake the realignment an Environmental Authorisation (EA) is required. The responsibility for the maintenance and management of the road lies with and will remain with the provincial DPWRT and not the mine. For this reason, as confirmed by the Department of Forestry, Fisheries and Environmental (DFFE), and application for EA is required to be submitted to the the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA).

The Draft Environmental Management Plan (EMP) is provided in Appendix A, whilst all maps and plans of the EMP and this Basic Assessment Report (BAR) are provided in Appendix B.

2 CONTACT PERSON AND CORRESPONDENCE ADDRESS

2.1 Applicant

The applicant for this Environmental Authorisation (EA) application process is North Block Complex (Pty) Ltd (NBC). Whilst NBC are applying for the EA and will be responsible for the construction of

the new road, it is important to remember that the responsibility for the road will remain vested with the provincial DPWRT. The contact details for NBC are provided in **Table 2.1**.

Table 2.1: Contact Details of the Applicant.

NAME OF COMPANY	North Block Complex (Pty) Ltd
CONTACT PERSON	Mr Maleho Musi
PHYSICAL ADDRESS	Spitzkop Road, Portion 5 of Paardeplaats Farm 380 JT, Belfast, 1100
POSTAL ADDRESS	North Block Complex (Pty) Ltd, PO Box 275, Belfast, 1100
TELEPHONE NUMBER	+27 (0) 10 900 0419
EMAIL ADDRESS	m.musi@universalcoal.com

2.2 Details of the EAP who Prepared the Report

In terms of Regulation 13 of the NEMA Environmental Impact Assessment (EIA) Regulations, 2014 (GNR. 982), as amended, an independent Environmental Assessment Practitioner (EAP) must be appointed by the applicant to manage the application. Commodity Inspections Group (Pty) Ltd (CIGroup) has been appointed by North Block Complex (Pty) Ltd as the independent environmental assessors responsible for conducting the required Environmental Authorisation Processes and will be responsible for Report Development, Specialist Assessments, requisite Stakeholder Engagement Processes (SEP), and Authority and Government Department Liaison.

CIGroup's Environmental Compliance and Assessment Manager, Renee Janse van Rensburg, will be the project EAP and her contact details are provided in **Table 2.2**.

Table 2.2: Contact Details of the EAP.

NAME OF COMPANY	Commodity Inspections Group (Pty) Ltd
CONTACT PERSON	Renee Janse van Rensburg
PHYSICAL ADDRESS	51 Brunton Street, Foundersview South, Edenvale, 1609
POSTAL ADDRESS	PO Box 90482, Bertsham, Johannesburg, 2013
TELEPHONE NUMBER	+27 (0) 10 592 1080
EMAIL ADDRESS	reneejvr@cigroup.za.com

2.3 Expertise Of The EAP

The project EAP is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations, 2014, as well as Section 1 of the NEMA. This includes, inter alia, the requirement that the EAP is:

- Objective and independent;

- Has expertise in conducting EIAs;
- Complies with the NEMA, the environmental regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

2.3.1 EAP Qualifications

The qualifications of the project EAP are presented in **Table 2.3** whilst proof of the qualifications is provided in **Appendix D**. The project EAP is responsible to ensure that Continued Professional Development (CPD) is prioritised. A summary of the project EAPs CPD the last five (5) years is provided in **Table 2.4**.

Table 2.3: Qualifications of the EAP.

YEAR OBTAINED	QUALIFICATION	TERTIARY INSTITUTION
2003	MSc (Environmental Management)	Rand Afrikaans University, now the University of Johannesburg
2001	BSc Honours (Geography & Environmental Management)	
2000	BSc (Earth Sciences)	

Table 2.4: CPD of the EAP.

YEAR COMPLETED	COURSE/PROGRAMME DETAILS
In Progress	Carbon Footprint Analyst
2020	Environmental Law Event
2020	Renewable Energy Workshop
2019	Environmental Law Update
2019	Transforming Our World: Achieving the Sustainable Development Goals
2019	The Business of Mining
2019	Mine Closure and Recent Case Law
2018	Environmental Law Event
2018	Environmental Law Update
2018	International Climate Change Law & Policy
2018	Understanding NEM:WA
2017	National Adaptation Plans
2017	Environmental Law Update

2.3.2 Summary Of The EAPs Past Experience

The project EAP has over 19 years' experience in mining projects, integrated environmental, water and waste authorisation processes, environmental and water auditing and performance assessments, and the management of large inter-disciplinary specialist teams. She has the ability to develop and maintain relationships with authorities and significant experience in stakeholder engagement processes including consultation with responsive or hostile I&APs, Non-governmental Organisations (NGOs), and the general public. She has a proven track-record in obtaining positive environmental, water and waste authorisations. She is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and is a registered Professional Natural Scientist (Pr.Sci.Nat) with the South African Council for Natural Scientific Professions (SACNASP).

The project EAPs Curriculum Vitae detailing her expertise in EA processes is presented in **Appendix D** together with her professional registrations.

3 LOCATION OF THE ACTIVITY

The D 2809 Provincial Road is located near eMakhazeni in the Mpumalanga Province and runs from the Siyathuthuka Road in a southerly direction until it reaches the N 4 toll road. The project falls within the eMakhazeni Local Municipality (LM) which falls under the Nkangala District Municipality (DM). The existing road is east of the current NBC opencast mining operations and traverses' portion 13, 29 and 30 of the Farm Paardeplaats 380 JT. The most recent (2021) Life of Mine (LoM) plan from NBC extends beyond the existing road (**Figure 3.1**), necessitating the permanent realignment of the road.

The proposed realigned D 2809 road will traverse only 2 farm portions, namely portion 13 and 29 of the Farm Paardeplaats 380 JT. The location description for the proposed realigned D 2809 road is provided in **Table 3.1**. The co-ordinates of the proposed permanent realignment of the D 2809 Provincial Road are presented in **Table 3.2**, whilst **Table 3.3** details the farm portions on which the D 2800 road will be realigned (Windeed, 2021). The location of the proposed road is presented in **Figure 3.2**.

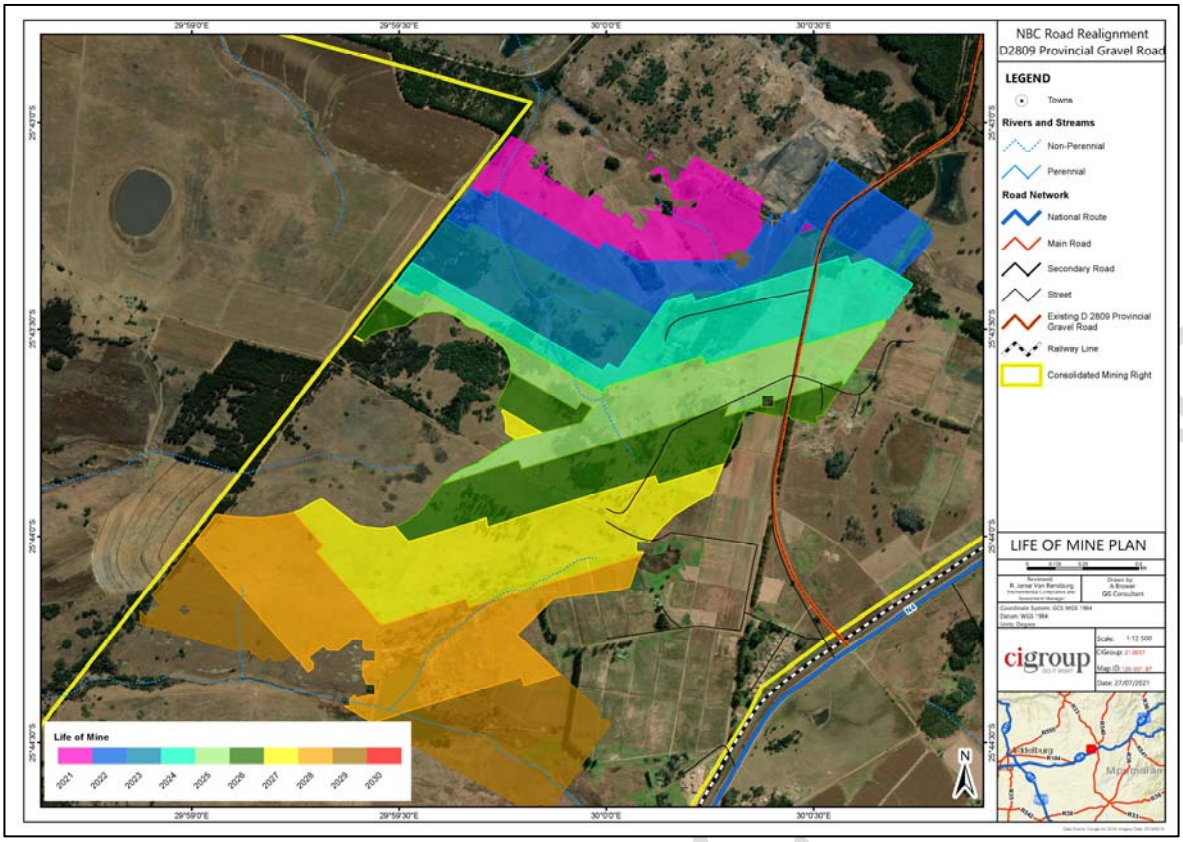

Figure 3.1: 2021 LoM Plan.

Table 3.1: Property Details for the Proposed Realigned D 2809 Provincial Road.

FARM NAME	Paardeplaats 380 JT		
APPLICATION AREA	±20,800 – 24,000 m^2 **dependent on final design*		
MAGISTERIAL DISTRICT	Nkangala District Municipality and the Emakhazeni Local Municipality		
DISTANCE AND DIRECTION FROM NEAREST TOWN	±3.5 kilometres (km) south-south-west of the town of eMakhazeni (Belfast) and approximately 3.8 km south-south-east of the closest formal settlement, Siyathuthuka Township		
21 DIGIT SURVEYOR GENERAL CODE FOR EACH FARM PORTION	Paardeplaats 380 JT	Portion 13	T0JT00000000038000013
	Paardeplaats 380 JT	Portion 29	T0JT00000000038000029

Table 3.2: Starting, Middle and End Point of Activity.

ACTIVITY	LATITUDE (S)			LONGITUDE (E)		
Starting Point of Activity	25°	42'	51.90"	30°	00'	53.41"
Middle Point of Activity	25°	43'	43.62"	30°	00	52.99"
End Point of Activity	25°	44'	11.67"	30°	00'	31.02"

Table 3.3: Land Ownership for the Proposed D 2809 Provincial Road Realignment.

LANDOWNER	PORTION NUMBER	FARM NUMBER	REGISTRATION DIVISION	SG CODE
North Block Complex (Pty) Ltd	13	380	JT	T0JT00000000038000013
North Block Complex (Pty) Ltd	29	380	JT	T0JT00000000038000029

Figure 3.2: Location of the Proposed Realigned D 2809 Provincial Road.

4 DETAILED PROJECT DESCRIPTION

The information in this Section was extracted from the Detailed Road Design report (Strydom & Malan, 2020), which is provided in **Appendix E**. It must be noted that this report is currently being updated based on adjustments to the proposed road realignment route to accommodate

environmental concerns, as address in **Section 8.4**. The updated report will be provided with the Final BAR.

4.1 Road Design Standards

The proposed road has been designed in accordance with TRH17 and TRH20 specifications and the guidelines proposed by the South African National Road Agency Limited (SANRAL) and the Council for Scientific and Industrial Research (CSIR). The standards used are summarised in **Table 4.1**.

Table 4.1: Road Design Standards Utilised.

ASPECT	STANDARDS
Design Speed	80 km/h except for the take-off bends which are 60 km/h
Minimum K-values for the vertical curves	33 for crest curves 25 for slag curves
Minimum length for vertical curves	140 m
Minimum longitudinal slope of road	0.5% (1:200)
Maximum longitudinal slope of road	7% (1:14.29)
Minimum radius of horizontal curvature for 80 km/h	210 m (actual minimum used: 250 m)
Minimum radius of horizontal curvature for 60 km/h	110 m (actual minimum used: 110 m)
Road width of road	8 m
Cross fall of road	3% (1:33.33)
Proposed road reserve	25 m
wearing coarse	2 175 mm = 350 mm

4.2 Structural Design of the Unpaved Road

The structural design of the unpaved road was done in accordance the TRH20 specifications.

The maximum number of Average Daily Traffic (ADT) or vehicles was taken as 200 (with 60 heavy vehicles, 80 kN axles) per day. The road will consist out of two 175 mm thick layers apart from the fill required to form the vertical alignment. This would give a road design life or re-ing frequency of 10.67 years with regular grader and roller maintenance.

The option of less traffic, namely ADT = 150 (45 heavy vehicles) was also calculated for the two 175 mm thick layers and it would give a road design life or re-ing frequency of 12.71 years with regular grader and roller maintenance.

The road design life or re-ing frequency with regular grader and roller maintenance can only be confirmed once the actual characteristics of the borrow materials for the layer works are known.

4.3 Hydrology and Stormwater Management

Stormwater management is a critical component in road design to ensure a good level of service and user safety. The stormwater management system was designed for a 1 in 20 year storm occurrence.

4.3.1 Catchment Areas and Flood Calculations

Ten (10) different catchment areas affecting the new road were identified.

The Rational Method was used to determine the stormwater peak floods. A mean annual rainfall of 732.5 mm was used with the mean 24 hour maximum as 60.5 mm and the mean thunder days per annum as 69. A runoff factor of 0.33 was used for the predominantly flat (hydrological classification) area. The surface runoff for each catchment area was evaluated as percentages between a defined water course and overland flow. The time of concentration was thus calculated with the percentage's tor each type of flow. The runoff will predominantly consist of overland flow.

The data and peak flows for the individual catchment areas are summarised in **Table 4.2**.

Table 4.2: Data and Peak Flows per Catchment.

CATCHMENT AREA	AREA (m^2)	PEAK FLOW (l/s) 1:20 YEAR RETURN	PEAK FLOW (l/s) 1:50 YEAR RETURN
1	46,039	486	682
2	57,716	528	741
3	348,107	2,452	3,443
4	18,311	233	327
5	18,735	212	297
6	32,912	330	464
7	146,969	1,197	1,681
8	215,900	1,767	2,481
9	177,215	1,478	2,076
10	236,722	1,724	2,422

4.3.2 Stormwater Berms

Stormwater berms will be constructed from the clayey cut to spoil material from the road cross section to prevent the flooding of the new road. These berms will direct the stormwater runoff to existing stream channels and dams. At critical positions, the stormwater will be directed underneath the road through pipe culverts. The flow capacities of the berms were calculated as open channel flow with the Manning theory.

4.3.3 Stormwater Culverts/Pipes

Where water velocities are high and the direction of now changes rapidly, erosion will occur. All the culverts envisaged have conventional inlets with wing-walls. Stone pitching will be provided over a distance of twice the vertical dimension upstream of the culvert inlet, including the concrete slab between the wing-walls.

Provision will be made for energy dissipation and erosion protection downstream of the culvert, with stone pitching over a distance of twice the vertical dimension downstream of the culvert outlet, including the concrete slab between the wing-walls.

The slope (gradient) of the culverts cannot be at the same level for the inlet and outlet of the culvert as the slowing of the flow will cause sand and silt sedimentation and reduction in the culvert flow capacity. Water velocities will be altered as little as possible, and a minimum flow velocity of 0.7 m/s will be ensured to prevent sedimentation.

The flow capacities of the pipe culverts were calculated with the Manning theory.

5 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

5.1 Listed Activities

The Department of Forestry, Fisheries and Environment (DFFE) has, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), developed a list of activities which are likely to have an impact on the environment. The Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982), together with Listing Notice 1 (GN R983), Listing Notice 2 (GN R984) and Listing Notice 3 (GN R985) were published in 2014 and amended on 7 April 2017 (GN 327), 13 July 2018 (GN 706) and 11 June 2021 (GN 517). Any activity which is listed under these notices requires an environmental assessment to be conducted and approved before the activity can proceed. Activities falling under Listing Notice 1 (GN R983) or Listing Notice 3

(GN R985) require a Basic Assessment (BA) to be conducted while any activity falling under Listing Notice 2 (GN R984) requires a full Scoping and Environmental Impact Reporting (S&EIR) process to be conducted.

Identification of the Listed Activities (LAs) that are applicable to this application was determined after assessing the required developments for the road and then comparing these to the listed activities in the NEMA Listing Notices. The LAs associated with the proposed D 2809 Provincial Road Realignment, based on the most recent amendments, are presented in **Figure 5.1** and detailed in **Table 5.1** overleaf.

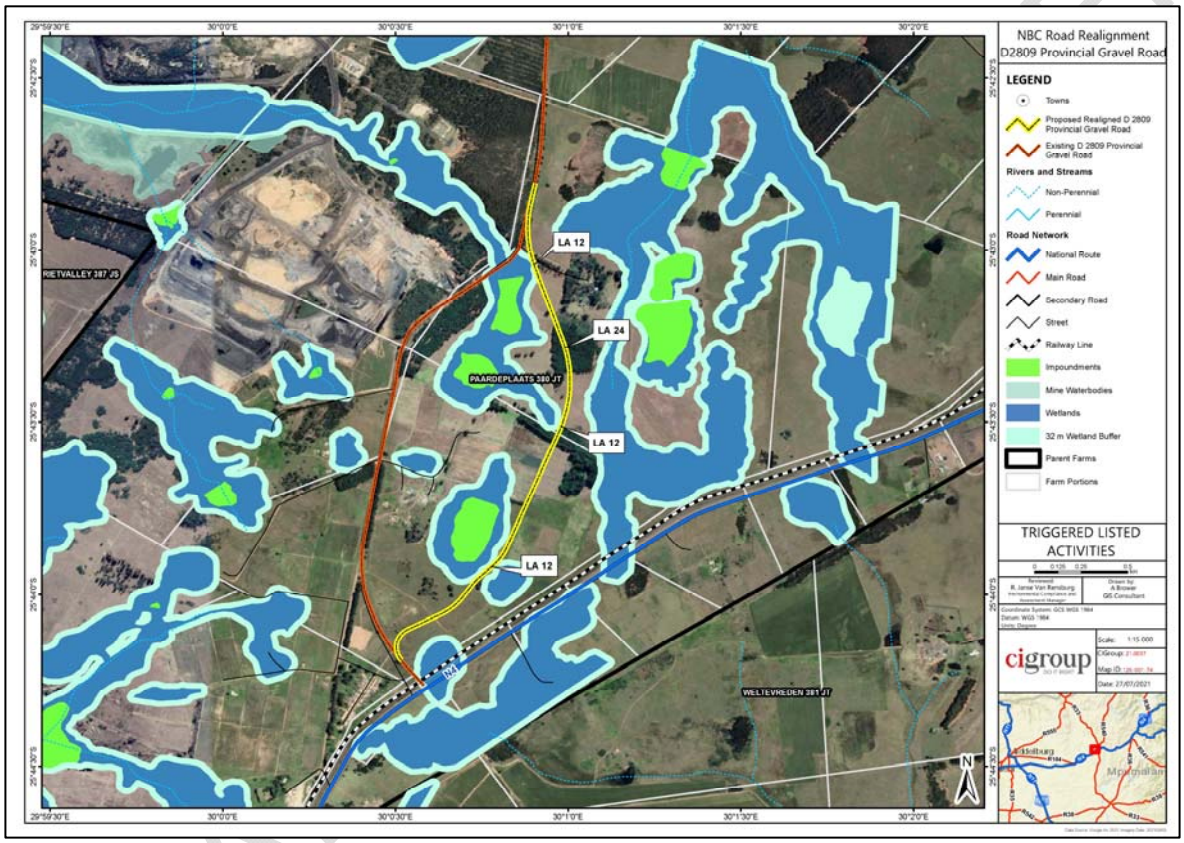

Figure 5.1: Proposed Permanent Realignment Triggered Listed Activities.

In summary, the following LAs apply to this application:

1. GNR 983, LN 1: Activity 12 and 24.

Table 5.1: Listed Activities Being Applied for in terms of the NEMA.

REGULATION & ACTIVITY NO.	LISTED ACTIVITY DESCRIPTION	DESCRIPTION
GN R983, LN 1 Activity 12	**The development of-** ~~i. dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or~~ **ii. infrastructure or structures with a physical footprint of 100 square metres or more;** **where such development occurs-** ~~a. within a watercourse;~~ ~~b. in front of a development setback; or~~ **c. if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;-** ~~excluding-~~ ~~(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;~~ ~~(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;~~ ~~(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;~~ ~~(dd) where such development occurs within an urban area;~~ ~~(ee) where such development occurs within existing roads, road reserves or railway line reserves; or~~ ~~(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of the development and where indigenous vegetation will not be cleared.~~	Proposed road exceeds 100 square metres (m^2) and occurs within 32 m measured from the edge of a watercourse (i.e., wetland).

REGULATION & ACTIVITY NO.	LISTED ACTIVITY DESCRIPTION	DESCRIPTION
GN R983, LN 1 Activity 24	**The development of a road-** ~~i. for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or~~ **ii. with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;** ~~but excluding a road-~~ ~~a. which is identified and included in activity 27 in Listing Notice 2 of 2014;~~ ~~b. where the entire road falls within an urban area; or~~ ~~which is 1 kilometre or shorter.~~	Proposed road will be 8 m wide, have a road reserve of 25 m and will be approximately 2.8 km in length.

6 POLICY AND LEGISLATIVE CONTEXT

The legislative context for the identified environmental authorisation process is provided herewith.

6.1 Constitution of South Africa, 1996 (Act No. 108 of 1996)

The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) is the supreme act to which all other acts must speak to. The Constitution sets out the rights for every citizen of South Africa and aims to address past social injustices. With respect to the environment, Section 24 of the constitution states that:

"Everyone has the right:

a) To an environment that is not harmful to their health or well-being; and

b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

i. Prevent pollution and ecological degradation;

ii. Promote conservation; and

iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".

All companies are thus duty-bound to constitutional, legislative, and other measures to prevent pollution and ecological degradation, promote conservation and to develop in a sustainable manner. The constitutional environmental right elevates the importance of environmental protection and conservation and emphasises the significance that South Africans attach to a sound and healthy environment. The constitution also establishes the idea of the Polluter Pays Principal and is simply that the party responsible for pollution of the environment remains responsible for financial reparations of the impacts from their activities.

6.2 National Environmental Management Act (Act No. 107 of 1998)

6.2.1 NEMA Principles

The NEMA provides the framework environmental legislation and establishes an integrated environmental management system for South Africa. It aims to prevent pollution and degradation of South Africa's natural environments while promoting sustainable economic and social development.

Central to NEMA is the idea of Integrated Environmental Management (IEM). IEM seeks to:

- Promote the integration of the principles of environmental management into the making of all decisions;

- 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 Section 2 principles; and
- Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.

Any decision taken in respect of an application for environmental authorisation should consider the principles as set out in Section 2 of NEMA. The principles include:

- The Polluter Pays Principle: The Polluter Pays Principle means that "polluters and users of natural resources (should) bear the full environmental and social costs of their activities". The Polluter Pays Principle can also be described as an economic principle that requires the polluter to be held liable to compensate or pay for pollution prevention, minimisation, and remediation. Therefore, the crux of the principle is to impose economic obligations when environmental damage is caused by a polluter, and this is achieved by setting minimum rules on liability for environmental damage.
- The Precautionary Principle: The Precautionary Principle provides guidance during development or when anything occurs which might harm the environment and where there is scientific uncertainty. NEMA stipulates and requires "a risk averse and cautious approach" to be applied and that decision-makers should take into account the limits of current knowledge about the consequences of decisions and actions".
- The Preventative Principle: The Preventive Principle is reflected in the concept that the disturbance of ecosystems and loss of biological diversity are to be "…avoided, or…minimised and remedied". Furthermore, the principle prescribes that the disturbance of the landscape and the nation's cultural heritage is to be avoided, and where it cannot be altogether avoided, must be minimised and remedied. The principle aims to minimise environmental damage by requiring that action be taken at an early stage of the process, and if possible, before such damage actually occurs. Broadly stated, it prohibits any activity which causes or may cause damage to the environment in violation of the duty of care established under environmental law.
- Cradle-to-Grave: A Cradle-to-Grave stewardship perspective indicates the adoption of a comprehensive ecological view of the impacts of a process on the environment, commencing with research, development and design through the extraction and use of raw materials, production and processing, storage, distribution and use, to the final disposal of the product and the waste generated as a by-product. The cradle-to-grave principle advocates liability as a result of, or caused by, policies, programmes, projects, products, processes, services, and activities. Given the general purpose of NEMA, together with the other sustainability

principles, this legal liability may include to rectify, remedy, or compensate for environmental damage or degradation.

6.2.2 NEMA Duty of Care

Chapter 7 of NEMA contains essential provisions dealing with liability for environmental damage in South Africa and two key elements form part thereof; namely: pollution prevention and remediation. A duty of care is contained in Section 28, which encompasses the main liability provision which applies retrospectively and therefore also to historical pollution. Section 28(1) applies to all forms of pollution and is formulated generally by providing a duty of care to avoid, minimise and/or remedy pollution or environmental degradation.

In terms of this subsection, the duty imposes liability on an almost non-exhaustive category of persons, because it refers to "every person". Section 28(2) goes even further and imposes the duty on a range of people including owners or people in control of land or premises and people who have the right to use the land or premises on which, or in which, an activity or process is, or was, performed or undertaken, or any other situation exists which causes, or is likely to cause, significant pollution or degradation to the environment.

The duty of care imposes strict liability since Section 28(1) requires reasonable persons to take reasonable measures. Subsection (3) provides an indicative range of measures that can be considered as “reasonable measures” and these may include measures to investigate, assess and evaluate the impact on the environment; inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation, contain or prevent the movement of pollutants or the causing of degradation, eliminate any source of the pollution or degradation and to remedy the effects of the pollution or degradation.

One can identify from the wording an obligation to prevent and minimise pollution or degradation and this indicates that remediation is clearly part of South African law. Where a company fails to take reasonable measures to prevent or minimise pollution, it can be directed to do so by the relevant authority and if it does not comply with the directive, measures will be taken by government on its behalf, but at the company’s expense. Under Section 34(7), liability is specifically extended to the director of the company concerned in his or her personal capacity, in other words, the director is personally liable.

Furthermore, Section 43 provides that if directors failed to take all reasonable steps to prevent the offence being committed, and monetary advantage was gained, they may be personally liable for

damages or compensation, have to pay a fine, or have to comply with remedial measures determined by the Court, and may even have to pay the State's investigative costs.

6.3 National Water Act (Act No. 36 of 1998)

One of the main and ever-continuing concerns in South Africa is the sustainability of water management, and the costs associated with the prevention and remediation of pollution in a country with an average rainfall far below international standard. The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is one of the government's answers to some of these challenges and functions as sectoral legislation within the framework of the NEMA.

The NWA aims to ensure the protection and sustainable use of South Africa's water resources. The three main pillars of the NWA are sustainability, equity, and efficiency. The NWA provides for a Section 21 Water Uses which a company will have to apply for, before commencing with any water use related activities through a Water Use License (WUL) application process or through a General Authorisation (GA) process, if applicable. Various conditions may be attached to these GAs or licenses and a breach thereof will result in criminal and civil liability. The conditions attached to water use authorisations will function alongside the additional protective measures, duty of care and statutory liability provisions provided by the NWA and other legislation to regulate a whole array of water issues.

Section 19 of the NWA mirrors the provision of Section 28 of NEMA and addresses the prevention and remediation of the effects of pollution through the Polluter Pays Principle. The NWA provides a wide duty of care in that:

"(1) an owner of land, a person in control of land or a person who occupies or uses the land on which:

a) any activity or process is or was performed or undertaken; or

b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing, or recurring."

According to NWA, water may not be used without prior authorisation from the leading authority, in this case the DHSWS. Due to the requirements of the NWA, a GA needs to be compiled and submitted to the DHSWS for authorisation to ensure the legality of the proposed water uses.

Sections 40 and 42 of NWA provides for the responsible authority to request public participation and an assessment of the likely effect of the proposed licence the protection, use, development,

conservation, management, and control of the water resource. The NWA defines 11 consumptive and non-consumptive water uses in terms of Section 21 of the NWA:

- Section 21(a): Taking water from a water resource;
- Section 21(b): Storing water;
- Section 21(c): Impeding or diverting the flow of water in a watercourse;
- Section 21(d): Engaging in a stream flow reduction activity;
- Section 21(e): Engaging in a controlled activity: irrigation of any land with waste or water containing waste;
- Section 21(f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, or other conduit;
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource;
- Section 21(h): Disposing in any manner of water which contains waste from, or which has been heated in any industrial or power generation process;
- Section 21(i): Altering the bed, banks, course, or characteristics of a watercourse;
- Section 21(j): Removing, discharging, or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people;
- Section 21(k): Using water for recreational purposes.

Water uses that are not permissible in terms of Schedule 1 of the NWA need to be authorised under a tiered authorisation system as a General Authorisation in terms of the General Authorisations as published under Section 39 of the NWA or as a water use licence, as provided for in terms of Section 21 of the NWA. The authorisation system allows for the "Reserve" and provides for public consultation processes in the establishment of strategies and decision making and guarantees the right to appeal against such decision.

The proposed D 2809 Provincial Road requires authorisation in terms of GN 509, 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). A risk assessment will be undertaken in accordance with GN 509 for the construction and operational activities associated with the proposed realignment of the D 2809 Provincial Road in order to determine activities regarded as being of low risk to associated watercourses, and those that are regarded as having a moderate to high risk to associated watercourses. This is being undertaken as a separate application to the EA process.

6.4 National Heritage Resources Act (Act No. 25 of 1999)

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) has applicability, as the study forms part of an overall Heritage Impact Assessment (HIA) in terms of the provisions of

Section 34, 35, 36 and 38 of the NHRA and forms part of a study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the impact assessment phase of the HIA process.

According to Section 34 of the NHRA, no person may alter, damage or destroy any structure that is older than 60 years, and which forms part of the sites built environment, without the necessary permits from the relevant provincial heritage authority.

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, Palaeontological Impact Assessments (PIAs) and Archaeological Impact Assessments (AIAs) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

A section 36 permit application is made to the South African Heritage Resources Agency (SAHRA) or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permit applications for burial grounds and graves older than 60 years should be submitted to the South African Heritage Resources Agency:

a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of the conflict, or any burial ground or part thereof which contains such graves.
b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the

applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

A NHRA Section 38 (HIA) application to the Mpumalanga Provincial Heritage Resources Agency (MP-PHRA) is required when the proposed development triggers one or more of the following activities:

a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
b) the construction of a bridge or similar structure exceeding 50 m in length;
c) any development or other activity which will change the character of a site,
    i. exceeding 5 000 m^2 in extent; or
    ii. involving three or more existing erven or subdivisions thereof;
    iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

Section 38 (3) Impact Assessments are required, in terms of the statutory framework, to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected;
- The assessment of the significance of such resources;
- The assessment of the impact of the development on the heritage resources;
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits;
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development;
- Consideration of alternatives; and
- Plans for mitigation.

A Heritage Impact Assessment (HIA) was undertaken in 2012 for the proposed Exxaro Paardeplaats Colliery. During this survey, the proposed road realignment formed part of the study area and was also indicated on a map that was submitted as part of the HIA report. In 2021, an updated HIA was undertaken for the Glisa and Paardeplaats Sections of the NBC Colliery (NBC). Further field assessments and a revisit to all the heritage sites identified in 2012 was undertaken. Seeing that the road realignment was previously assessed and approved by SAHRA, the heritage specialist corresponded with SAHRA on the matter. SAHRA recommended that a field assessment of the

proposed road realignment be undertaken and that the findings of the field assessment be presented to SAHRA in letter format. This letter is provided in **Appendix E**.

6.5 Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998)

The Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA) is responsible for making provisions with respect to nature conservation in the Mpumalanga province. It provides for, among other things, protection of wildlife, hunting fisheries, protection of endangered fauna and flora as listed in the Convention of International Trade in Endangered Species (CITES) of wild flora and fauna, the control of harmful animals, freshwater pollution and enforcement. The objectives of the MNCA are to consolidate the laws relating to nature conservation applicable in the Mpumalanga province and to provide for matters connected therewith. The MNCA focuses on the protection of critically endangered to vulnerable fauna, and flora within the province.

7 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

The National Development Plan (NDP) 2030 identifies the need for South Africa to invest in a strong network of economic infrastructure designed to support the country's medium and long-term economic and social objectives. Energy infrastructure is a critical component that underpins economic activity and growth across the country and therefore, it needs to be robust and extensive enough to meet industrial, commercial, and household needs. The NDP 2030 defines a desired destination where inequality and unemployment are reduced, and poverty is eliminated so that all South Africans can attain a decent standard of living.

Electricity is identified in the NDP 2030 as one of the core elements of a decent standard of living. Whilst South Africa moves from its reliance on a few primary energy sources, such as coal, the demands for electricity will continue. Coal-powered electricity generation will make up the largest share of such provision to meet this demand. The need for the provision of electricity equitably amongst South Africans is clear and as such the importance of coal mines that provide coal to Eskom is undeniable.

NBC has an existing supply agreement with Eskom to supply steady and secure coal for selected Eskom coal fired power stations over the coming years. NBC will produce enough coal from their current mining section, the Integrated Paardeplaats Section, to meet its contractual obligations to Eskom. In order for NBC to expand its opencast mining activities to meet its contractual obligations to Eskom, NBC needs to permanently realign the existing D 2809 Provincial Road.

The road is used by the general public, landowners, and workers accessing land along the road. The permanent realignment of the D 2809 Provincial Road will ensure that the road will remain a provincial road after realignment so that use by the general public, landowners, and workers to access land along the road, including businesses, homesteads, and schools, is not restricted or permanently affected. In order to ensure that the rights of road users are not infringed, the permanently realignment of the road is of paramount importance.

8 LOCATION, ACTIVITY, DESIGN AND ROUTE ALTERNATIVES CONSIDERED

8.1 Location or Property

The proposed location is limited to the area that the D 2809 Provincial Road currently services. The properties where the realigned road is proposed for development are, in turn, influenced by the proposed NBC LoM plan. Based on these aspects, no alternative locations or properties were considered.

8.2 Type of Activity

The activity to be undertaken includes the development of a new road. No alternative activities were considered.

8.3 Design Criteria

No alternative design criteria were considered.

8.4 Route

The LoM plan defines the proposed opencast mining activities that will be undertaken by NBC. Based on the most recent (2021) LoM plan (**Figure 3.1**), the D 2809 Provincial Road falls within the planned mining area. The D 2809 needs to be permanently realigned to avoid the mining area. Five (5) iterations for the proposed realignment route were considered (**Figure 8.1**), resulting in the preferred permanent realignment route (**Figure 3.2**).

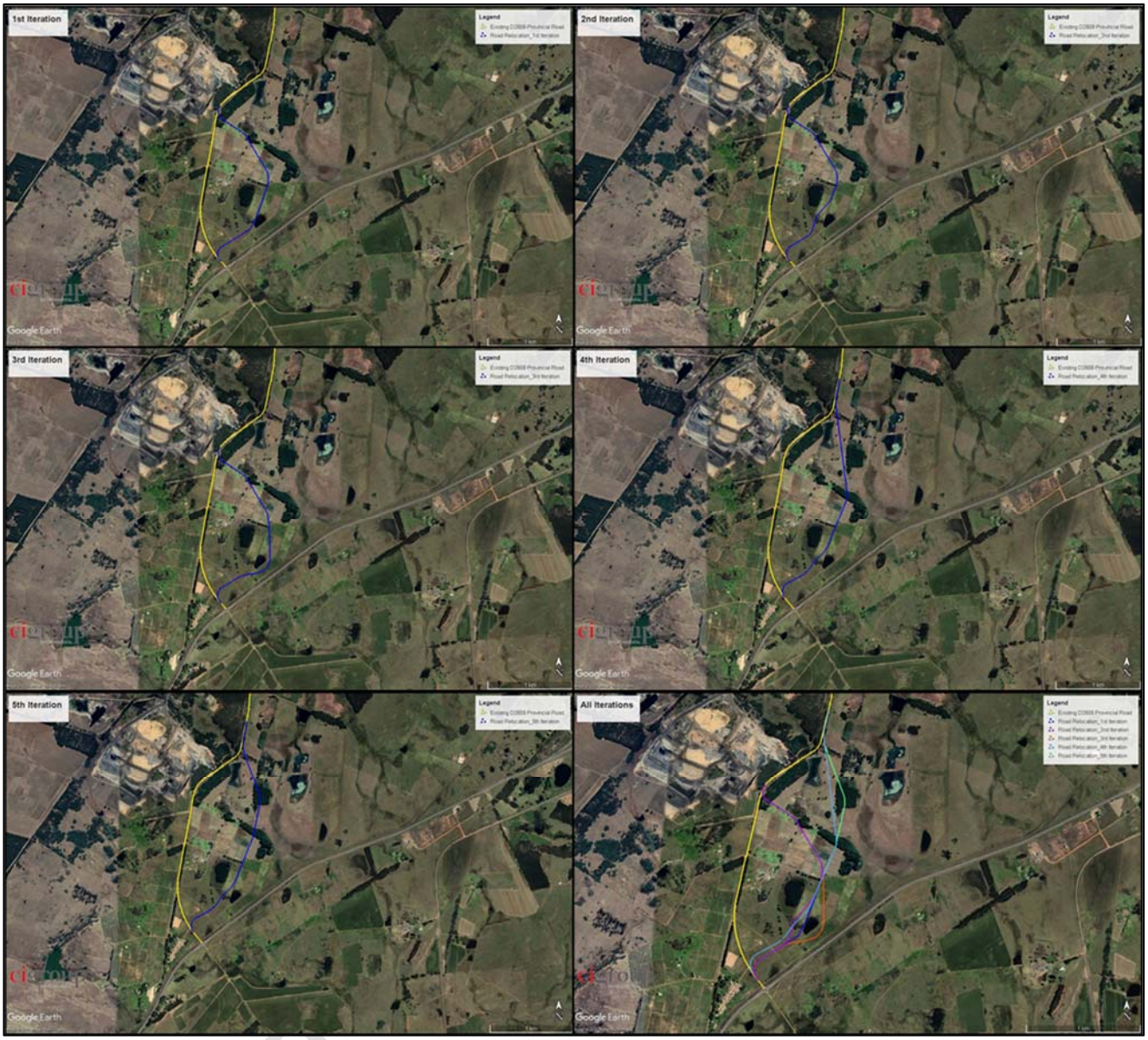

Figure 8.1: D 2809 Provincial Road Permanent Realignment Iterations.

8.5 Option of Not Implementing the Activity

The option of not implementing the activity would result in the existing D 2809 Provincial Road being kept in its current location. If the existing road was to be kept, then the NBC LoM plan would need to be reconsidered and the coal resource in the vicinity of the existing road would be sterilised. Another option would be that NBC maintain the current LoM plan resulting in the existing road being mined through without an alternative route being provided.

The option of not approving the activities applied for would result in a notable portion of the confirmed mineable coal resource not being available for extraction, lessening the supply of coal to Eskom for power generation and negatively impacting Eskom's ability to provide power to South

Africa. The loss of revenue generated by the mine to the national Gross Domestic Product (GDP) and the eMakhazeni LM would be a resultant knock-on effect.

9 MOTIVATION FOR THE OVERALL PREFERRED ROUTE

The first four (4) iterations of the proposed road realignment, as presented in **Figure 8.1**, were considered taking engineering and environmental factors into account. The fifth (5th) iteration was proposed taking identified wetlands and heritage sites into consideration, resulting in the route avoiding wetlands and increasing buffer areas around heritage sites.

The preferred route (**Figure 3.2**) takes the requirements for avoidance of wetlands and heritage sites into consideration, together with road design criteria (**Table 4.1**) in mind.

10 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

Public consultation is an essential part of environmental authorisation processes. This legal requirement exists with the aim to ensure that all relevant Interested and Affected Parties (I&APs) are meaningfully notified and consulted, to ensure their opinions are considered during the authorisation process. The process aims to ensure that all stakeholders are provided an opportunity to participate as part of a transparent process which allows for a robust and comprehensive environmental study. The Stakeholder Engagement Process (SEP) for the D 2809 Provincial Road Realignment needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with international best practise options;
- Compliance with national legislation;
- Establish and manage relationships with key stakeholder groups; and
- Involvement and participation in the environmental study and authorisation/approval process.

The SEP ensures that all I&APs have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures an inclusive report and process. The aim of the SEP is to:

- Introduce the project;
- Explain the environmental authorisation requirements for the road realignment;
- Inform I&APs of their opportunity to participate in the processes and to garner input from I&APs to inform the various reports that will be developed;

- Gather input on the local area and concerns of residents;
- Record all issues, concerns, objections and opinions received for submission to the relevant authority for consideration in their decision-making process;
- Establish lines of communication between Stakeholders, I&APs and the project team;
- Identify all the significant issues related to the project; and
- Identify possible mitigation measures or environmental management plans to minimise

The SEP must comply with the legislative requirements of the NEMA, which require public participation as part of an environmental application processes. The SEP will be integrated as far as possible to present all environmental licensing application processes to I&APs. The engagement process is a continuous process that will be undertaken for all aspects of the D 2809 Provincial Road realignment process.

No SEP has been undertaken at this stage. The SEP proposed is as follows:

1. Notification of submission of the application for EA and availability of the Draft Basic Assessment Report (BAR) for comment in the Middleburg Observer on 30 July 2021;
2. Notification of the application for EA and notification of availability of the Draft BAR for comment in site notices placed along the current road route on 30 July 2021;
3. Notification of the application for EA and notification of availability of the Draft BAR for comment via electronic mail, short message service or WhatsApp, hand delivered notifications, or through Background Information Documents (BIDs) on 30 July 2021; and
4. One-on-one discussions with identified Interested and Affected Parties (I&APs) and stakeholders.

CIGroup will make use of online meetings for consultation with all parties to ensure that the requirements for engagement align with the provisions of the Disaster Management Act, 2002 (Act No. 57 of 2002), as amended, with specific reference to health and safety precautions associated with COVID-19.

10.1.1 Document Review

All I&APs will be provided with an opportunity to comment on the Draft Basic Assessment Report (BAR) as required in terms of the NEMA. This report serves as the Draft BAR for public comment. The report has been made available for a period of 32 days from 31 July 2021 – 2 September 2021, during which Stakeholders, I&APs and Registered I&APs are encouraged to provide their comments on the report. The Draft BAR will be available for review via download from https://cigroup.za.com/public-documents/ and provided in hard copy on request.

All comments received on the Draft BAR will be incorporated into the Final BAR for submission to the MDARDLEA for review and decision. All comments received from Stakeholders, I&APs and Registered I&APs will be addressed where possible in the Final BAR and included in the Comments and Response Report (CRR) which will be submitted with the Final BAR.

10.1.2 Issues and Comments

No issues have been raised thus far, comments are anticipated once the Draft BAR (this report) has been circulated to all stakeholders and I&APs.

A detailed Stakeholder Engagement Process (SEP) report (**Appendix C**) will be provided with the Final BAR.

11 DESCRIPTION OF THE BASELINE ENVIRONMENT

NBC commissioned specialist assessments in May 2021 as part of an Integrated Environmental Authorisation (IEA) application in terms of the NEMA and a Section 102 Consolidation process in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). The area of assessment for these processes is presented in **Figure 11.1**, and includes the road realignment area, so for this reason applicable information from these assessments have been extracted for this use in the draft BAR. In addition to this, the Freshwater Ecosystem and Heritage specialist were requested to provide updated reports/inputs for the road realignment. All specialist assessments consulted for completion of this section are presented in **Appendix E**.

11.1 Climate

Based on an evaluation of the meteorological data simulations run from the global NOAA Environmental Modelling System (NEMS) weather model at approximately 30 km resolution from 1985 to current of the project area, the following deductions can be made (**Figure 11.2**):

- In the summer months' maximum average daily temperatures are predicted to be 21°C - 24°C on average with a maximum of 30°C possible during hot days, dropping to a predicted 9°C - 13°C on average at night and 3°C minimum on cold nights.
- During winter months the average day time temperature are predicted in the 16°C - 19°C range while cold winter night-time temperatures are predicted to drop to -1°C.

Falling in a summer rainfall area, the D 2809 road area is predicted to receive the most precipitation in the summer months of October - March as can be seen in **Figure 11.2**. November - January are predicted the highest rainfall months with between 140 – 179 mm predicted per month during

these months. February, March and October are predicted to receive 79 – 103 mm precipitation. All other months are predicted to receive less than 43 mm precipitation on average during the month.

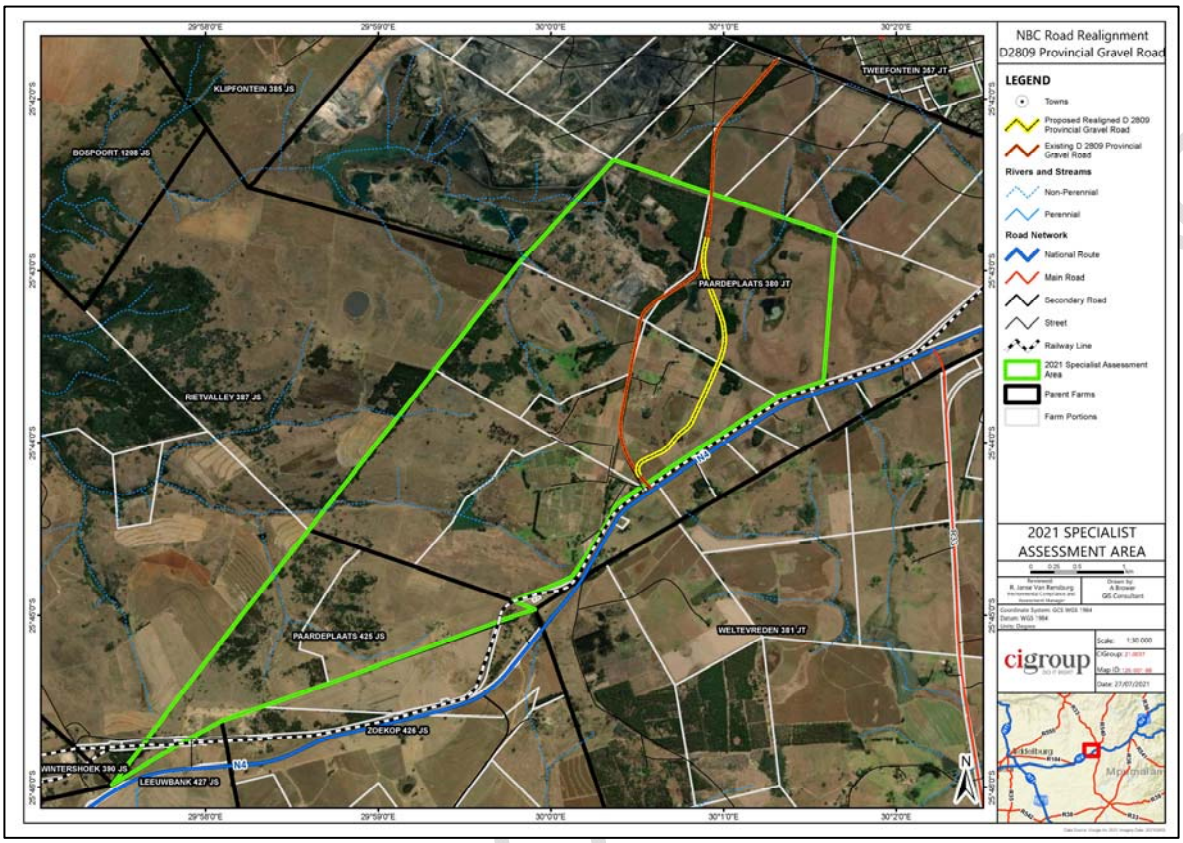

Figure 11.1: 2021 Specialist Assessment Area.

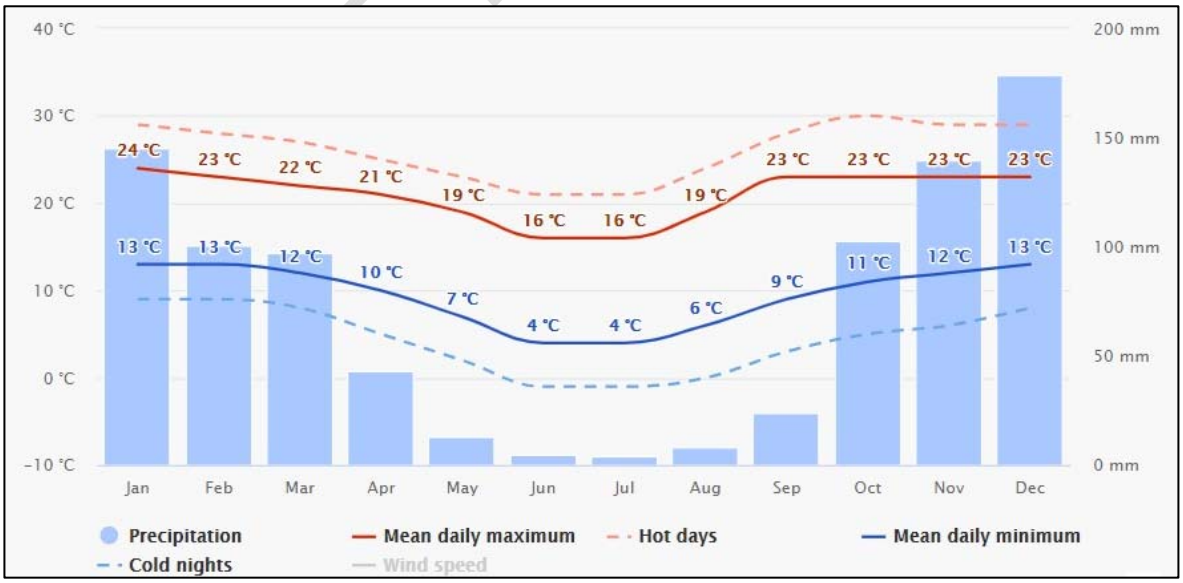

Figure 11.2: Average Temperature and Precipitation.

The total precipitation days predicted at the D 2809 road area are presented in **Figure 11.3**. The highest precipitation days are predicted during the months of October - March. During these months' precipitation is predicted to only occur 16 - 24 days on average. The rest of the year precipitation is predicted to occur less than 9 days per month. Evaporation losses exceed rainfall throughout the year in the D 2809 road area which aligns with the warm and temperate nature of the area. The Mean Annual Evaporation (MAE) (Symons Pan) of the D 2809 road area is 1,500 mm (Bailey & Pitman, 2015).

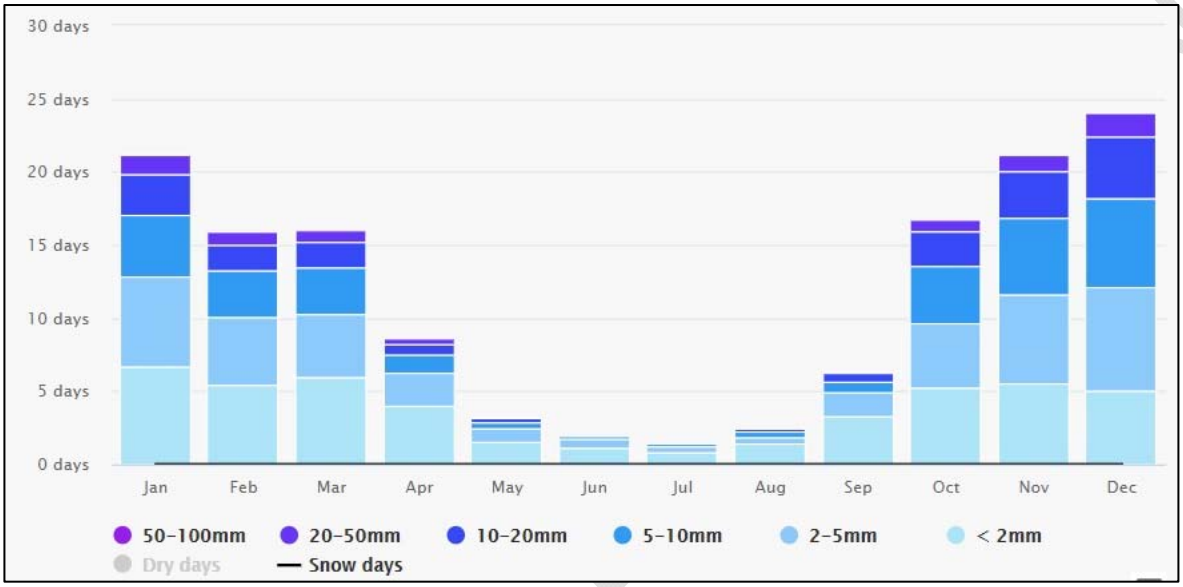

Figure 11.3: Day Count of Total Daily Precipitation per Month (1985 – present).

A period wind rose for the D 2809 road area is presented in **Figure 11.4**. Wind roses comprise of 16 spokes which represents the direction from which winds blew during the period. The colours reflect the different categories of wind speeds. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories. Based on an evaluation of the meteorological data simulations run from the global NEMS weather model at approximately 30 km resolution from 1985 to current of the project area, the following deductions can be made:

- The predominant wind direction is predicted to occur mainly from the East-North-East (ENE) 1,073 hours per year.
- A secondary direction is predicted from North-East (NE) 592 hours per year and East (E) 635 hours per year, respectively, with wind speeds higher than 5 kilometres per hour (km/h).

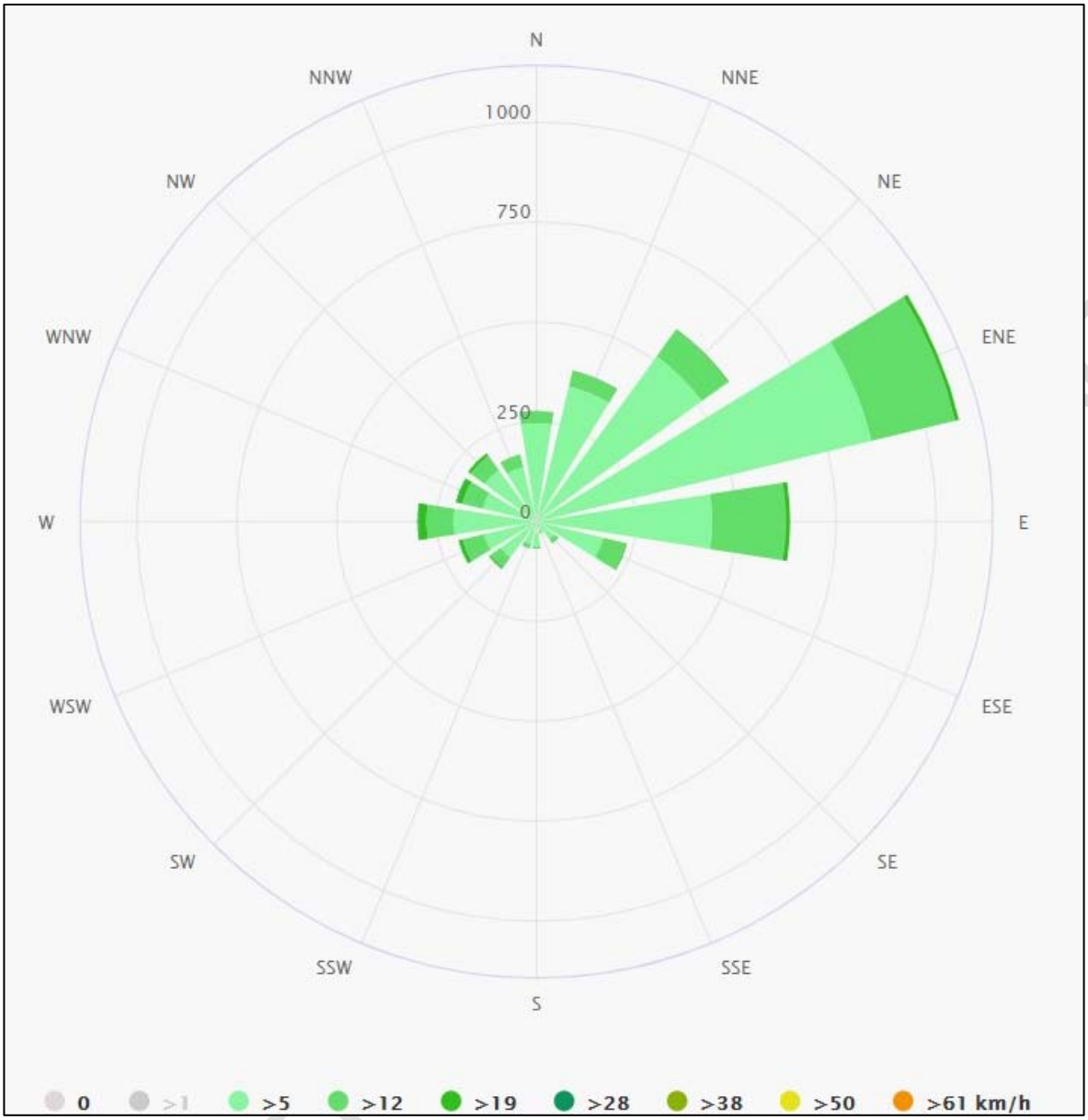

Figure 11.4: Predominant Wind Direction.

It is anticipated that calm conditions with wind speeds of 12 km/h or less for 11 - 18 days per month throughout the year will prevail at the D 2809 road area, whilst 12 - 19 km/h winds are predicted 8-16 days per month through the year (**Figure 11.5**). Wind speeds of more than 19 km/h are predicted to occur 1 - 3 days per year on average.

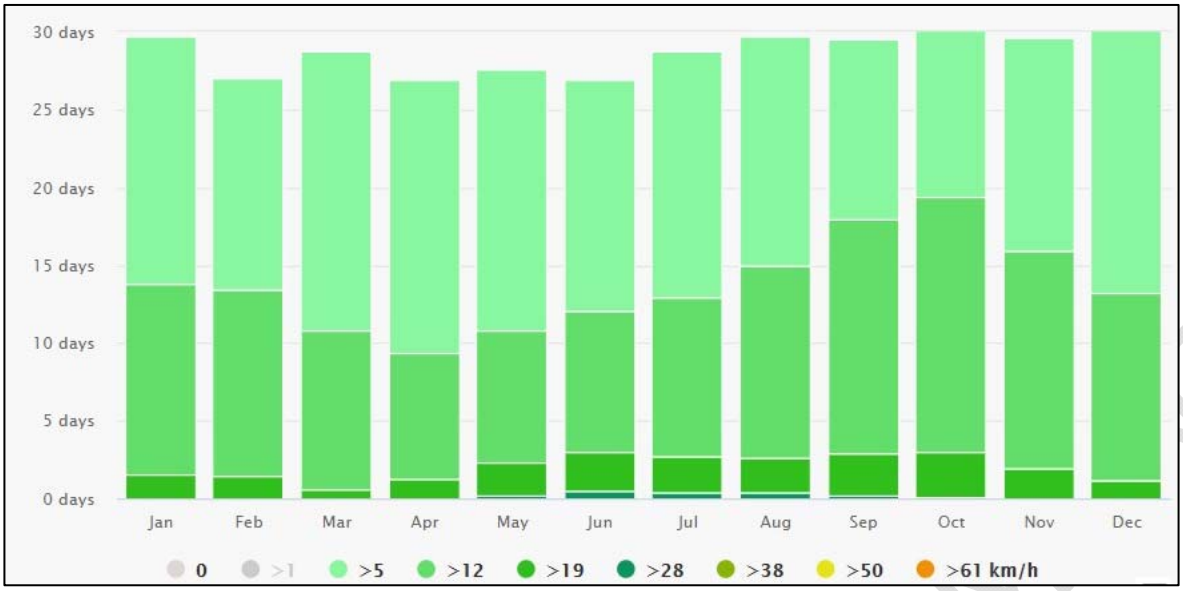

Figure 11.5: Wind Class Frequency Distribution per Month.

11.2 Air Quality

A number of sensitive receptors have been identified in the immediate vicinity of the D 2809 road area and include the town of Belfast, the informal settlement of Siyathuthuka, and various homesteads along and around the D 2809 road area. Various sources of emissions exist, all of which may impact on the identified sensitive receptors, including:

- Vehicle exhaust gases;
- Veld fires;
- Trucks passing on the roads, loading and offloading materials;
- Wind erosion as a result of Run of Mine (RoM) material and topsoil stockpiles at NBC;
- Material handling (loading, hauling and tipping) at NBC; and
- Other mining activities such as wind erosion and vehicle entrained dust.

NBC has a comprehensive dust monitoring campaign which has been in place since 2015. Two (2) of the sampling locations (PDP 1 and PDP 4) are located along the existing D 2809 road. Windblown settleable dust fall-out is monitored based on the ASTM International standard method for collection and analysis of Dustfall (ASTM D1739), with certain modifications. Dust fallout is measured against the National Dust Control Regulations (GNR 827), of the NEM:AQA (**Table 11.1**). In terms of GNR 827, a residential area means any area classified for residential use in terms of local town planning scheme, whereas a non-residential area means any area not classified for residential use as per local town planning scheme.

Table 11.1: National Dust Control Regulations Standards.

RESTRICTION AREAS	30-DAYS AVERAGE DUST FALL RATE (D) (mg/m²/day)	PERMITTED FREQUENCY OF EXCEEDING DUST FALL RATE
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1200	

The results of the NBC February 2021 monitoring period indicate no exceedances in terms of GNR 827 were observed.

11.3 Topography

The D 2809 road area is located in a hilly area at an altitude of approximately 1,851 - 1,920 metres above mean sea level (mamsl) (**Figure 11.6**). The site area is in the upper catchment region of the Steelpoort River, Grootspruit and Langspruit.

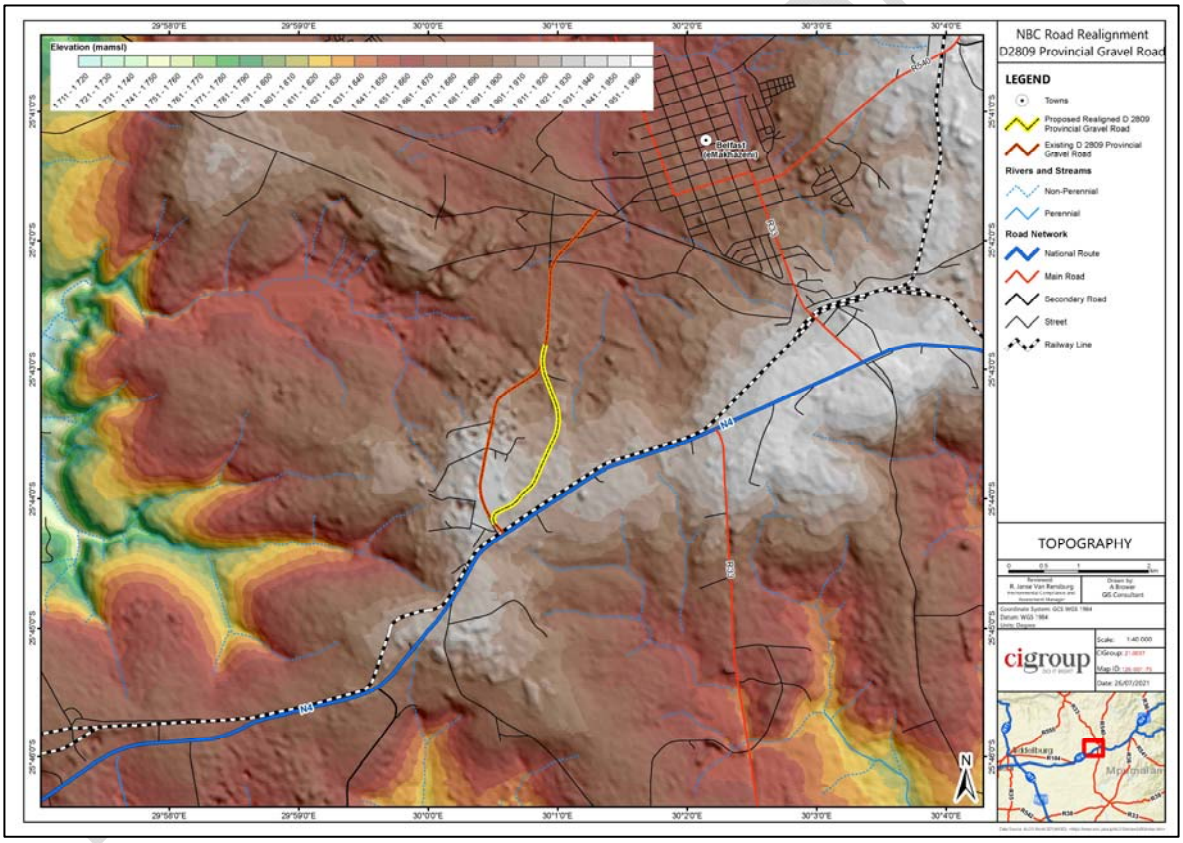

Figure 11.6: Topography of the D 2809 Road Area.

11.1 Geology

According to the 1:250 000 geological maps 2528 Pretoria and 2530 Barberton (Council for Geoscience, 1978 and 1986), the area is situated within the Witbank Coal field in the northern part of the main Karoo Basin (Karoo Supergroup). The coal reserves are found in the Vryheid Formation (Ecca Group) and consist predominantly of fine, medium, and coarse-grained sandstone with sub-ordinate mudstone, shale, siltstone, and carbonaceous shale (**Figure 11.7**). Elements from the Madzaringwe Formation of the Permian coal-bearing Ecca group (part of the Karoo Supergroup; Council for Geoscience, 2005) are also noted. Rocks are quartzite, shale, dolerite, diabase and basalt (Mucina & Rutherford, 2012).

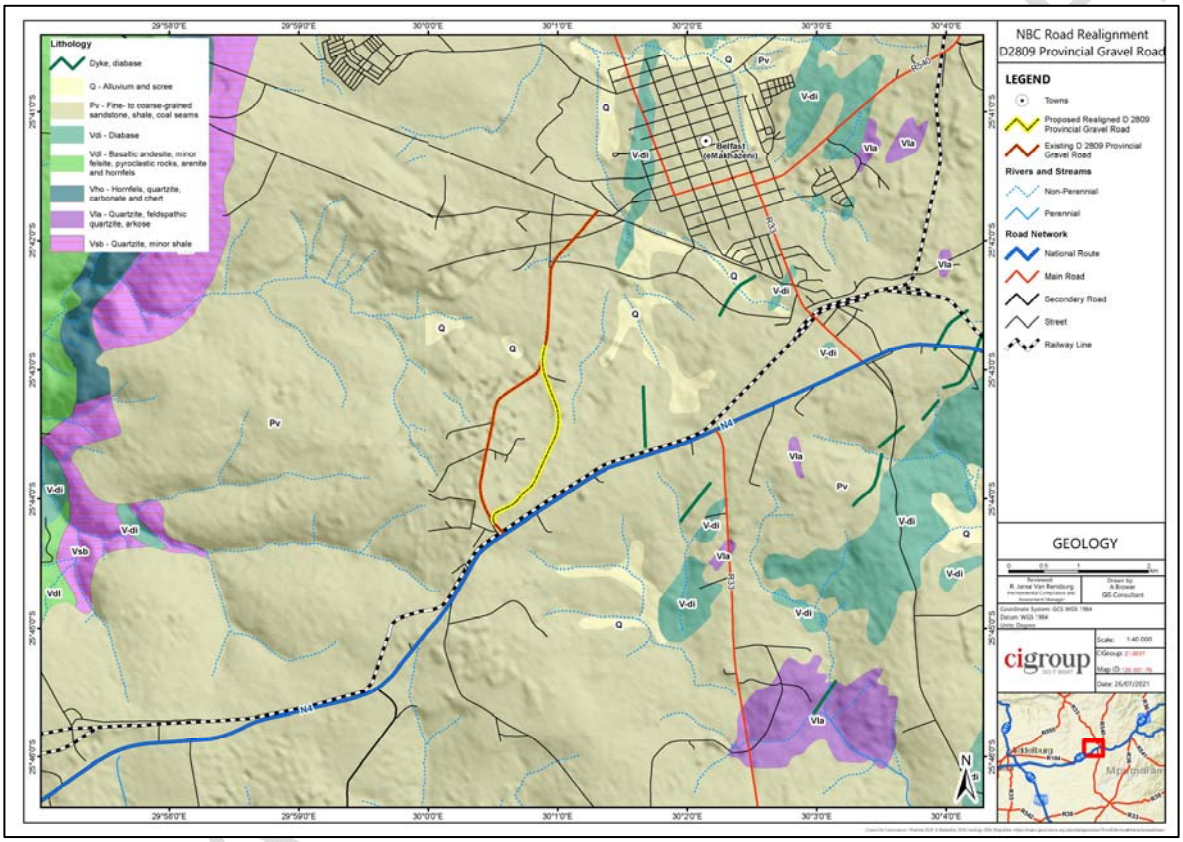

Figure 11.7: Geology Map of the D 2809 Road Area.

11.2 Terrestrial Biodiversity

11.2.1 Critical Biodiversity Areas

The D 2809 road area in relation to the Critical Biodiversity Areas (CBAs) for the Mpumalanga Province is presented in **Figure 11.8**. The road falls within an area classified as heavily modified areas, moderately modified areas, and CBA optimal areas.

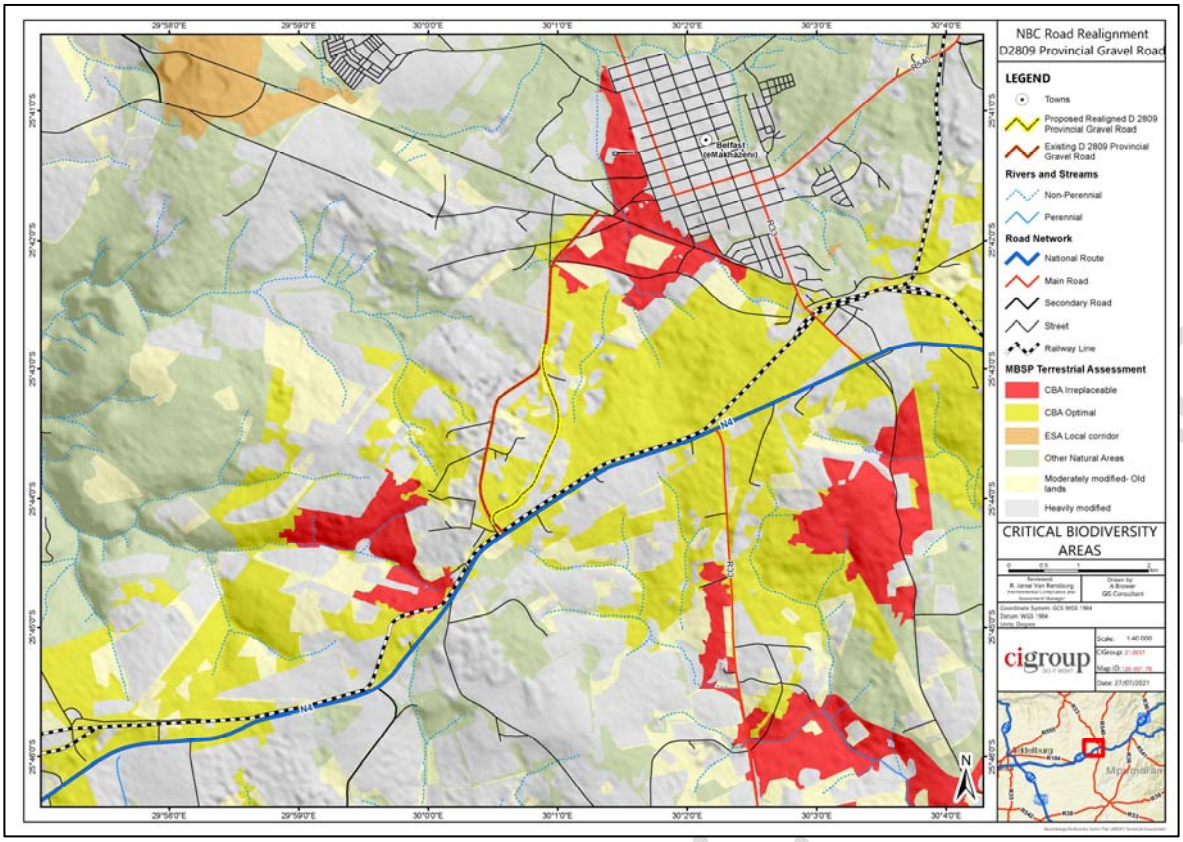

Figure 11.8: Critical Biodiversity Areas D 2809 Road Area.

11.2.2 Regional Vegetation

The D 2809 road area is situated in the Grassland Biome and within the Mesic Highveld Grassland Bioregion. The road is situated within the Eastern Highveld Grassland vegetation type (Gm 12) (**Figure 11.9**). The Eastern Highveld Grassland is characterised by slightly to moderately undulating plains, including some low hills and pan depressions. This vegetation type is considered to be Endangered on the National List of Threatened Terrestrial Ecosystems and is considered approximately 55% altered. It is considered to be poorly protected with only 13 % of its' target percentage protected (Lötter, 2015). The primary factor responsible for this status is due to on-going cultivation activities within the area.

The vegetation of the landscape is short dense grassland dominated by the usual highveld grass composition (*Aristida, Digitaria, Eragrostis, Themeda, Tristachya* etc) (Mucina & Rutherford, 2012). **Table 11.2** lists the floral species expected to occur within this region.

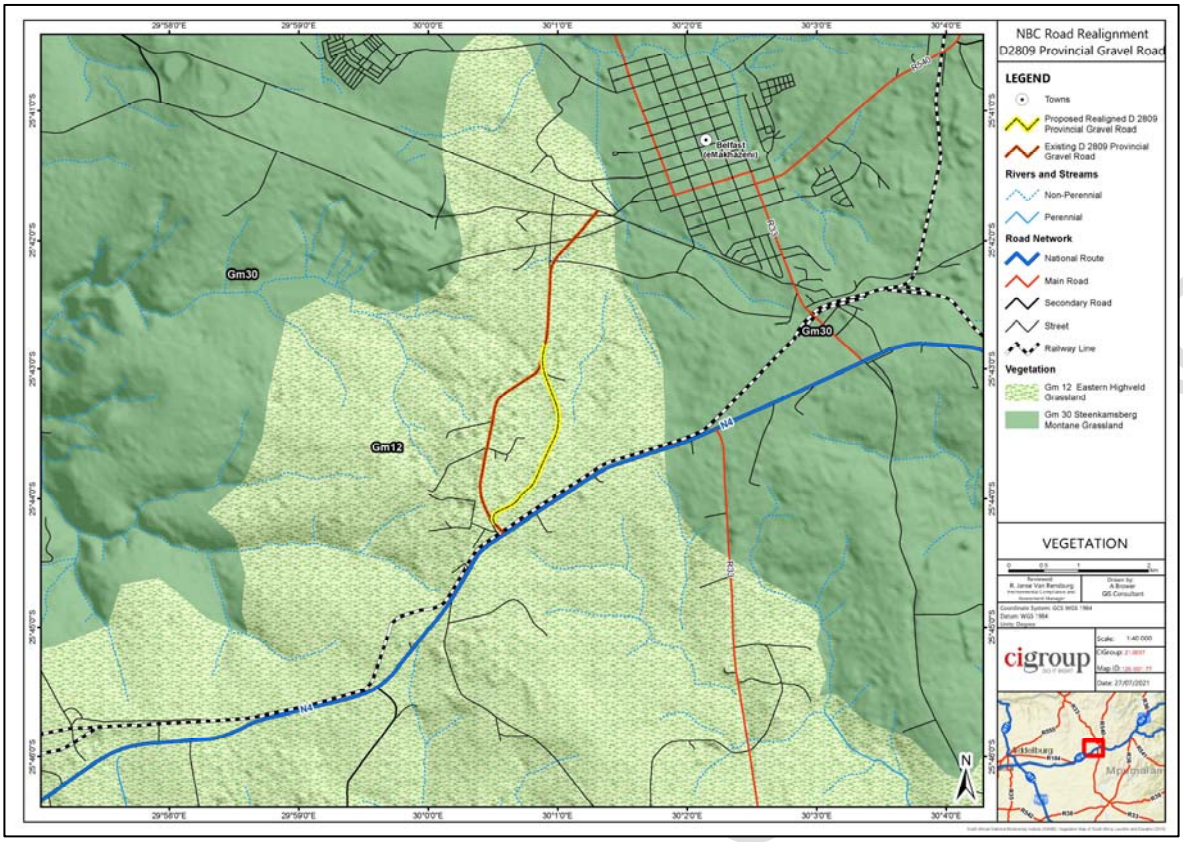

Figure 11.9: Vegetation of the D 2809 Road Area.

Table 11.2: Flora Species Characteristics of the Eastern Highveld Grassland.

PLANT FORM	SPECIES
Graminoids[1]	*Aristida aequiglumis, A. congesta, A. junciformis* subsp. *galpinii, Brachiaria serrata, Cynodon dactylon, Digitaria monodactyla, D. tricholaenoides, Elionurus muticus, Eragrostis chloromelas, E. capensis, E. curvula, E. gummiflua, E. patentissima, E. plana, E. racemosa, E. sclerantha, Heteropogon contortus, Loudetia simplex, Microchloa caffra, Monocymbium ceresiiforme, Setaria sphacelata, Sporobolus africanus, S. pectinatus, Themeda triandra, Trachypogon spicatus, Tristachya leucothrix, T. rehmannii, Alloteropsis semialata* subsp. *eckloniana, Andropogon appendiculatus, A. schirensis, Bewsia biflora, Ctenium concinnum, Diheteropogon amplectens, Harpochloa falx, Panicum natalense, Rendlia altera, Schizachyrium sanguineum, Setaria nigrirostris, Urelytrum agropyroides.*
Herbs	*Berkheya setifera, Haplocarpha scaposa, Justicia anagalloides, Pelargonium luridum, Acalypha angustata, Chamaecrista mimosoides, Dicoma anomala, Euryops gilfillanii, E. transvaalensis subsp. setilobus, Helichrysum aureonitens, H. caespititium, H. callicomum, H. oreophilum, H. rugulosum, Ipomoea crassipes, Pentanisia*

[1] Gramanoids means grasses and grass-like plants, such as sedges.

PLANT FORM	SPECIES
	prunelloides subsp. latifolia, Selago densiflora, Senecio coronatus, Hilliardiella oligocephala, Wahlenbergia undulata.
Geophytic Herbs[2]	*Gladiolus crassifolius, Haemanthus humilis subsp. hirsutus, Hypoxis rigidula var. pilosissima, Ledebouria ovatifolia.*
Succulent Herbs	*Aloe ecklonis.*
Low Shrubs	*Anthospermum rigidum subsp. pumilum, Seriphium plumosum.*

11.2.3 Species of Conservation Concern

The D 2809 road area is situated within the Quarter Degree Square (QDS) 2530CA. Based on the results of a search of historical records for the QDS on the Botanical Research and Herbarium Management Software (BRAHMS) New Plants of Southern Africa website (NEWPOSA), a number of Species of Conservation Concern (SCC) are indicated to potentially occur in the area.

11.2.3.1 Protected Flora

A recent (December 2020) study undertaken for the NBC Integrated Paardeplaats Section, within which the existing and proposed D 2809 road fall, indicated that a number of SCC were encountered within the Integrated Paardeplaats Section, of which one (1) species, *Aloe ecklonis*, was identified along the existing D 2809 road route (**Figure 11.10**). The identified species is listed under Schedule 11 Protected Plants (Section 69 (1) (a)) of the Mpumalanga Nature Conservation Act (Act No. 10 of 1998), 1998 (MNCA).

11.2.3.2 Protected Fauna

11.2.3.2.1 Mammals

The diverse regional vegetation presents an opportunity to support a variety of mammal species, namely the grassland and wetland habitats. The Virtual Museum of the Animal Demography Unit (ADU) (http://www.adu.org.za) was consulted to investigate the recent recordings of mammal SCC. Potential mammal SCC that may be encountered in D 2809 road area are listed in **Table 11.3**.

Table 11.3: Mammal SCC Likely to Occur within the Integrated Paardeplaats Section.

FAMILY	SPECIES	COMMON NAME	CONSERVATION STATUS
Erinaceidae	*Atelerix frontalis*	Southern African Hedgehog	NT

[2] Geophytic means a land plant that survives an unfavourable period by means of underground food-storage organs (e.g. rhizomes, tubers, and bulbs).

FAMILY	SPECIES	COMMON NAME	CONSERVATION STATUS
Felidae	*Panthera pardus*	Leopard	VU

NE=Not Evaluated, NT=Near Threatened, VU=Vulnerable, LC=Least Concern, EN=Endangered, X=Recorded in 2012

Figure 11.10: Location of Species of Conservation Concern.

11.2.3.2.2 Birds

According to the Important Bird and Biodiversity Areas (IBA) database, the D 2809 road area falls within the Steenkampsberg IBA (**Figure 11.11**). This area lies in the central South African plateau, and is characterised primarily of rolling high-altitude grasslands, interspersed with rocky outcrops. A very important wetland in the northern portion of this IBA, known as Middlepunt Vlei, provides habitat for the White-winged Flufftail (CE) (*Sarothrura ayresi*) with the species has been regularly recorded in the Carex-dominated marshes and nests have been recently recorded in the area.

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological condition are linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). Land cover is directly linked to habitats within the area of interest. The diversity of these habitats should give rise to many different species. According to the South African Bird Atlas Project (SABAP2) database, 239 species of birds

have been identified in greater area; the majority of these birds are comprised of grassland and waterbird species. Of these species, five have been assigned a Red Data status (Taylor MR, 2015) and are listed in **Table 11.4**.

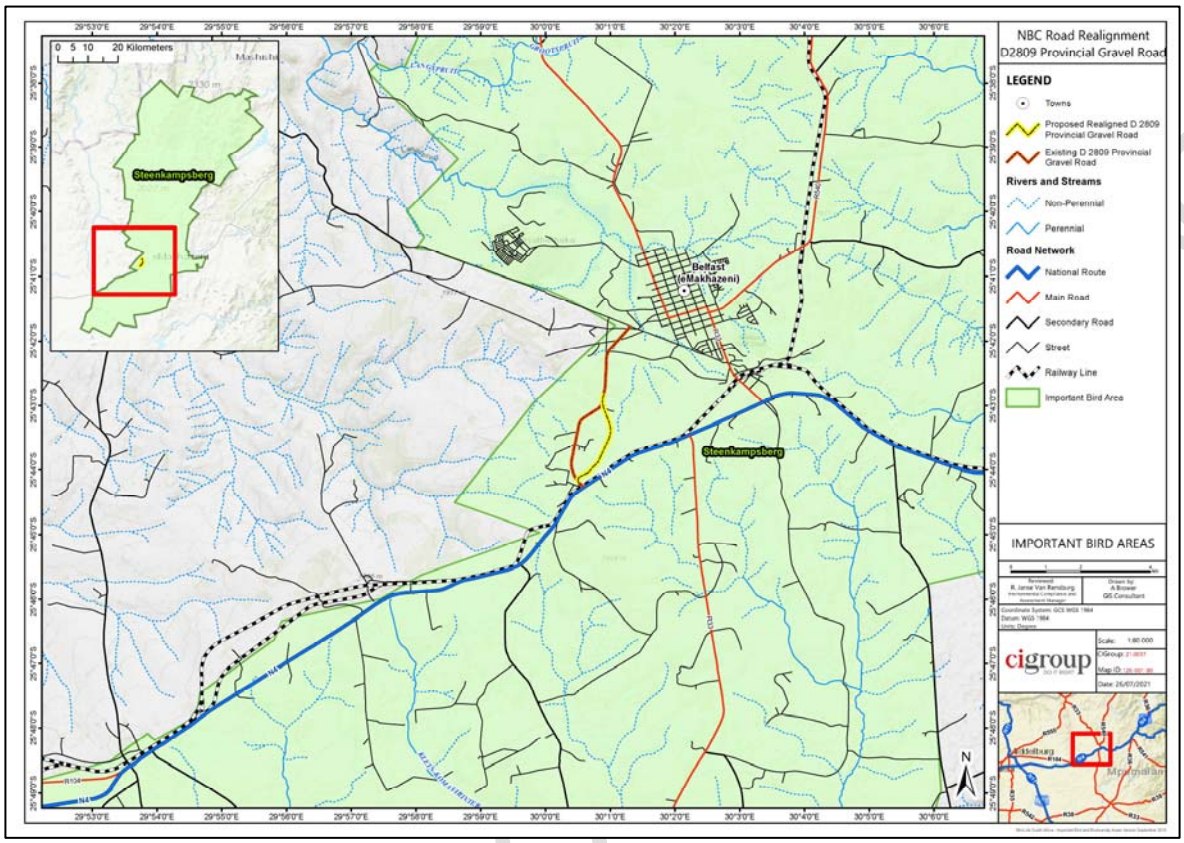

Figure 11.11: Important Bird and Biodiversity Areas.

Table 11.4: Potential Bird SCC that may Occur within the D 2809 Road Area.

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
Gruidae	*Anthropoides paradiseus*	Blue Crane	VU
Gruidae	*Bugeranus carunculatus*	Wattled Crane	VU
Gruidae	*Balearica regulorum*	Grey Crowned Crane	EN
Otididae	*Eupodotis caerulescens*	Blue Korhaan	NT
Phoenicopteridae	*Phoeniconaias minor*	Lesser Flamingo	NT
Threskiornithidae	*Geronticus calvus*	Southern Bald Ibis	VU

NE=Not Evaluated, NT=Near Threatened, VU=Vulnerable, LC=Least Concern, EN=Endangered

11.2.3.2.3 Amphibians

Amphibians are viewed to be good indicators of changes to the whole ecosystem as they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). Most species of amphibians are dependent on the aquatic environment for reproduction. Additionally, amphibians

are sensitive to water quality and ultraviolet radiation because of their permeable skin (Gerlanc, 2005).

Wetland clusters are groups of wetlands (within a 1 km buffer) that are considered to function as a unit in the landscape, allowing for important ecological processes such as migration of frogs and insects between wetlands to take place. Numerous pans and wetlands have been identified within the greater road area and thus provide ideal habitat (among others) for the SCC Giant African Bullfrog (*Pyxicephalus adspersus*); thus this species is therefore likely to occur. This is an SCC due to the loss of habitat from negative anthropogenic activities, the Giant African Bullfrog is listed as Near Threatened (NT) in South Africa according to the IUCN.

11.2.3.2.4 Reptiles

Reptiles are ectothermic (cold-blooded) meaning their internal basal temperature is influenced by their surrounding external environment, as a result, reptiles are dependent on environmental heat sources. Thus, many reptiles regulate their body temperatures by basking in the sun, or warmer surfaces (or substrates). Substrates are an important determining factor for identifying which habitats are suitable for which species of reptile. Rocky outcrops and suitable woody vegetation would increase habitat and intern diversity of reptiles within an area. Species richness for reptiles in South Africa is higher the north-eastern parts, and is declining in a south-westerly direction (Alexander, 2007). Areas with highest species richness correspond with the Savanna Biome, while the grassland biome has moderately low reptile species richness. A large component of the grassland biome has been transformed (around 80%), and as a result several reptile species are of conservation importance (Alexander, 2007). Of the potentially occurring reptile species one has been assigned Red Data status (South Africa Reptile Conservation Assessment (SARCA), 2014) and presented in **Table 11.5**.

Table 11.5: Potential Reptile SCC that may Occur within the D 2809 Road Area.

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
Cordylidae	Chamaesaura aenea	Coppery Grass Lizard	NT

NE=Not Evaluated, NT=Near Threatened, VU=Vulnerable, LC=Least Concern, EN=Endangered

11.2.3.2.5 Invertebrates

Butterflies are a good indication of the habitats available in a specific area (Woodhall, 2005). Butterflies are very sensitive to habitat degradation. Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species

which may be very specialised (Woodhall, 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify. One SCC that is likely to occur is the Marsh Sylph (*Metisella meninx*) (Vulnerable according to Henning, G. A. (2009) South African Red Data Book: Butterflies). This is a marsh species that requires thick clumps of grass, particularly *Leersia hexandra* (Poacea), and unpolluted environments. A marsh habitat is one of the most easily disrupted habitats and the apparent plight of this species brings it sharply into focus (Henning, 2009).

11.2.4 Flora

The floral composition and distribution within the greater road area has been significantly altered due to the historical and current land practises. Many areas are currently utilised for grazing, homestead settlements and mining activities. As a result of these land use practises, large portions have been subjected to alterations and have transformed the natural habitat. As a result of the land uses, secondary grasslands have developed and constitute as part of a vegetation community. There are numerous wetlands within the area which are distinguishable via their composition of wetland indicating species such as Red Cotton Wool Grass (*Imperata cylindrica*), *Cyperus sp*, *Juncus sp*. and *Schoenoplectus sp* (Sedges). A recent (December 2020) survey of the greater area resulted in the area being classified into vegetation units which are discussed in the sections that follow.

11.2.4.1 Vegetation Habitats

The site assessment in December 2020 concluded that the vegetation habitats delineated within the area include natural and secondary grasslands, wetlands and areas which have been largely and completely transformed from their original state. Three broadly defined vegetation habitats have been identified and are presented together with the potential floral SCC in **Figure 11.12**. The D 2809 road area comprises of Secondary Grassland, Wetland, and Transformed Habitats.

11.2.4.1.1 Transformed Habitat

For the purpose of this assessment, transformed land refers to areas that have been changed or disturbed to such an extent that all-natural habitats, biota and ecosystem functions have been fragmented or lost. The transformed areas are a direct result from mining activities and previous land-use practises. Past and current mining activities have completely changed the landscape and permitted AIP proliferation.

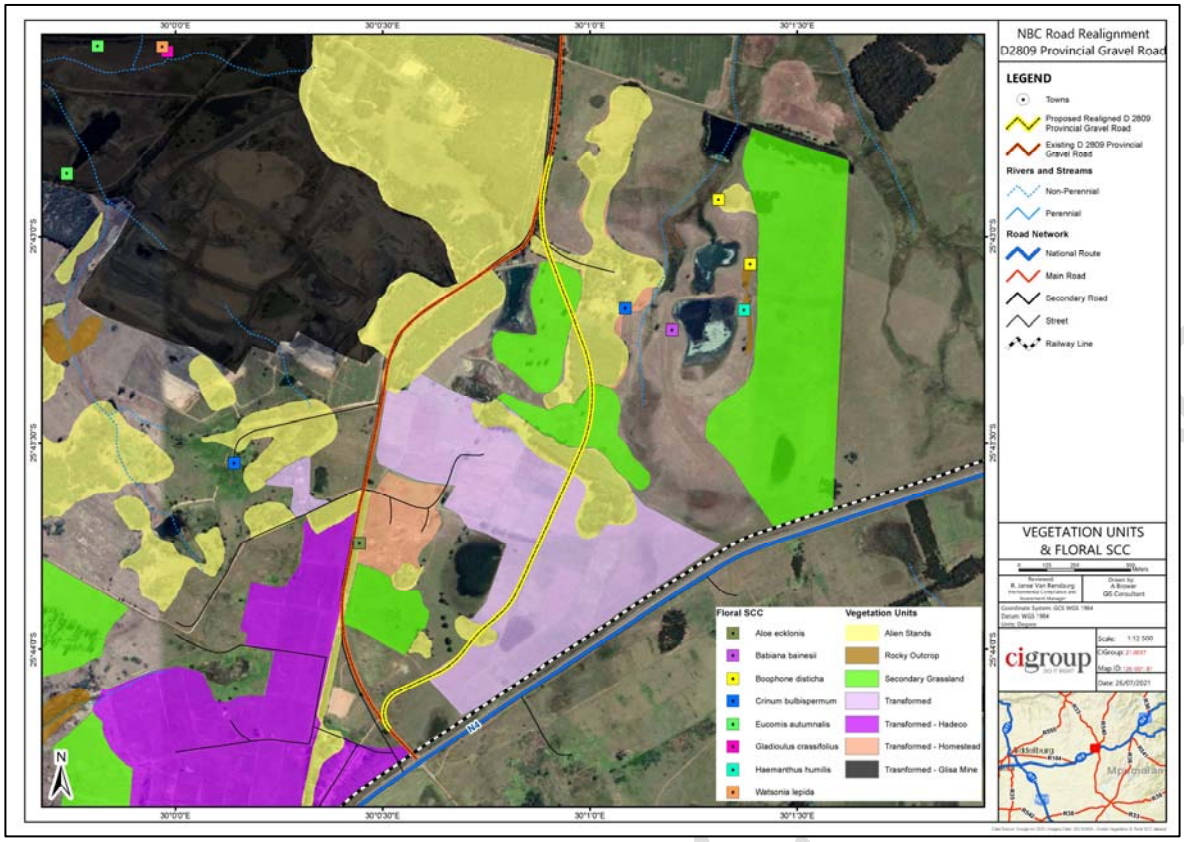

Figure 11.12: Vegetation Units Associated with the SCC.

11.2.4.1.2 Exotics/Alien Stands

Previous natural grasslands have been altered and/or transformed and have been replaced by carpets of *Pennisetum clandestinum* and pioneering AIP shrubs, trees and forbs such as *Cotoneaster franchetii*, *Acacia mearnsii*, *Datura stramonium*, *Hypericum forrestii*, *Cirsium vulgare*, *Solanum mauritanum*, *Eucalyptus sp.*, *Verbena brasiliensis*, and *V. officianalis* can be observed throughout the transformed areas. Remains of old rubble and/or building ruins and previous land practices are observed as unrehabilitated landscapes providing ideal hosting for pioneering AIP species. Vegetation considered in a natural state (where no evidence of transformation was observed) were identified within the margins of the wetland areas and rocky outcrops. Dense stands of *Populus x canescens* were observed along the margins of portion 13 of the farm Paardeplaats 425 JS. These dense stands of AIPs accelerate due to the favourable growing conditions, they consume large amounts of water, thereby lowing the water table and thereby threatening the water supplies in the ecology of the region (Bromilow, 2010).

11.2.4.1.3 Secondary Grassland

Secondary grasslands differ from primary grasslands, based on the extent of modification they have undergone. Secondary grasslands have undergone extensive modification and a fundamental

shift from their original state, such as cultivated fields and unmonitored grazing, yet they have been allowed to return to their grassland state (SANBI, Grasslands Ecosystems Guidelines: Landscape Interpretation for Planners and Managers., 2013). Although secondary grasslands appear as a counterfeit primary grassland, they differ with respect to species composition, vegetation structure, ecological functioning, and the ecosystem services they deliver (SANBI, 2013).

The established secondary grassland in the project area presented a well-developed graminoid and herbaceous component. The grasslands with easier accessibility to the cattle grazing presented a very low species diversity. The unmonitored grazing (cattle) is placing the remaining extent of the grasslands under pressure and altering the species composition, encouraging pioneer (increaser) species to flourish.

In conjunction with wetlands, grasslands support hydrological processes by acting as sponges, collecting rainwater, and assisting in flood attenuation through reduction of runoff and erosion. They act as critical life supporting systems for an array of biodiversity and endemic and threatened species. Grasslands in south Africa is one the most threatened biomes, with 30% of the biome transformed beyond repair and only 2% formally conserved.

11.2.4.1.4 Wetlands

Numerous wetlands have been recorded, delineated and monitored within the (Tony de Castro, 2020) (Wetland Consulting Services (Pty) Ltd, 2020) and updated in the most recent assessment undertaken by Ecology International (Pty) Ltd (2021). Wetlands are discussed in more detail in **Section 11.3** but are included here purely to represent a known vegetation habitat.

11.2.5 Fauna

11.2.5.1 Mammals

A total of thirteen (13) mammal species were recorded in the greater area during the December 2020 infield assessments. Various mammals of the Herpestidae (Mongoose) family were observed throughout the numerous wetlands. Tracks of a Water Mongoose were observed in the marshes of the unchanneled valley bottom wetlands.

Ground Squirrels, Scrub Hares and Yellow, Slender and Water Mongoose were observed throughout the greater area. These species are highly synanthropic meaning they thrive in the presence of human disturbance. No larger mammals were observed apart from cattle. Numerous Black-backed Jackals were also encountered.

11.2.5.1.1 Birds

Birds are viewed as good ecological indicators, as their presence or absence tends to represent conditions of a functioning ecosystem. The direct link between bird diversity and land cover portrays a direct indication of the habitats in the area of interest. According to the South African Bird Atlas Project (SABAP2) database, 239 species of birds have been identified in the greater area, the majority of these birds comprising of grassland and waterbird species. Eighty eight (88) birds were recorded during the field assessment in December 2020 (**Table 11.6**).

Table 11.6: Recorded Bird Species within the Greater Area (2020).

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
Accipitridae	*Buteo buteo vulpinus*	Steppe Buzzard	LC
Accipitridae	*Elanus caeruleus*	Black-winged Kite	LC
Accipitridae	*Haliaeetus vocifer*	African Fish Eagle	LC
Acrocephalidae	*Acrocephalus baeticatus*	African Reed-warbler	LC
Acrocephalidae	*Iduna natalensis*	Dark-capped Yellow Warbler	LC
Alaudidae	*Calandrella cinerea*	Red-capped Lark	LC
Alaudidae	*Mirafra fasciolata*	Eastern Clapper Lark	LC
Anatidae	*Alopochen aegyptiacus*	Egyptian Goose	LC
Anatidae	*Anas erythrorhyncha*	Red-billed Teal	LC
Anatidae	*Anas undulata*	Yellow-billed Duck	LC
Anatidae	*Dendrocygna viduata*	White-faced Duck	LC
Anatidae	*Netta erythrophthalma*	Southern Pochard	LC
Anatidae	*Plectropterus gambensis*	Spur-winged Goose	LC
Anhingidae	*Anhinga rufa*	African Darter	LC
Apodidae	*Apus barbatus*	African Black Swift	LC
Apodidae	*Apus caffer*	White-rumped Swift	LC
Apodidae	*Tachymarptis melba*	Alpine Swift	LC
Ardeidae	*Ardea cinerea*	Grey Heron	LC
Ardeidae	*Ardea melanocephala*	Black-headed Heron	LC
Ardeidae	*Bubulcus ibis*	Cattle Egret	LC
Ardeidae	*Egretta intermedia*	Yellow-billed Egret	LC
Charadriidae	*Charadrius tricollaris*	Three-banded Plover	LC
Charadriidae	*Vanellus armatus*	Blacksmith Lapwing	LC
Charadriidae	*Vanellus coronatus*	Crowned Lapwing	LC
Charadriidae	*Vanellus senegallus*	African Wattled Lapwing	LC
Cisticolidae	*Cisticola ayresii*	Wing-snapping Cisticola	LC
Cisticolidae	*Cisticola fulvicapilla*	Neddicky	LC
Cisticolidae	*Cisticola juncidis*	Zitting Cisticola	LC

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
Cisticolidae	*Prinia flavicans*	Black-chested Prinia	LC
Coliidae	*Colius striatus*	Speckled Mousebird	LC
Columbidae	*Columba arquatrix*	African Olive-pigeon	LC
Columbidae	*Columba guinea*	Speckled Pigeon	LC
Columbidae	*Streptopelia capicola*	Cape Turtle-dove	LC
Columbidae	*Streptopelia semitorquata*	Red-eyed Dove	LC
Columbidae	*Streptopelia senegalensis*	Laughing Dove	LC
Corvidae	*Corvus capensis*	Cape Crow	LC
Cuculidae	*Chrysococcyx caprius*	Diderick Cuckoo	LC
Cuculidae	*Cuculus solitarius*	Red-chested Cuckoo	LC
Falconidae	*Falco amurensis*	Amur Falcon	LC
Fringillidae	*Crithagra gualris*	Streaky-headed Seedeater	LC
Fringillidae	*Crithagra mozambicus*	Yellow-fronted Canary	LC
Hirundinidae	*Cecropis cucullata*	Greater Striped Swallow	LC
Hirundinidae	*Hirundo albigularis*	White-throated Swallow	LC
Hirundinidae	*Hirundo fuligula*	Rock Martin	LC
Hirundinidae	*Hirundo rustica*	Barn Swallow	LC
Hirundinidae	*Hirundo spilodera*	South African Cliff-swallow	LC
Hirundinidae	*Riparia cincta*	Banded Martin	LC
Hirundinidae	*Riparia paludicola*	Brown-throated Martin	LC
Laniidae	*Lanius collaris*	Common (Southern) Fiscal	LC
Laniidae	*Telophorus zeylonus*	Bokmakierie	LC
Laridae	*Chlidonias hybrida*	Whiskered Tern	LC
Locustellidae	*Bradypterus baboecala*	Little Rush-warbler	LC
Motacillidae	*Anthus cinnamomeus*	African Pipit	LC
Motacillidae	*Macronyx capensis*	Cape Longclaw	LC
Motacillidae	*Motacilla capensis*	Cape Wagtail	LC
Muscicapidae	*Cossypha caffra*	Cape Robin-chat	LC
Muscicapidae	*Saxicola torquatus*	African Stonechat	LC
Nectariniidae	*Chalcomitra amethystina*	Amethyst Sunbird	LC
Nectariniidae	*Nectarinia famosa*	Malachite Sunbird	LC
Numididae	*Numida meleagris*	Helmeted Guineafowl	LC
Passeridae	*Passer melanurus*	Cape Sparrow	LC
Phalacrocoracidae	*Phalacrocorax africanus*	Reed Cormorant	LC
Phalacrocoracidae	*Phalacrocorax carbo*	White-breasted Cormorant	LC
Phasianidae	*Pternistis natalensis*	Natal Spurfowl	LC
Phasianidae	*Pternistis swainsonii*	Swainson's Spurfowl	LC
Ploceidae	*Euplectes afer*	Yellow-crowned Bishop	LC

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
Ploceidae	*Euplectes orix*	Southern Red Bishop	LC
Ploceidae	*Euplectes progne*	Long-tailed Widowbird	LC
Ploceidae	*Ploceus capensis*	Cape Weaver	LC
Ploceidae	*Ploceus velatus*	Southern Masked Weaver	LC
Ploceidae	*Quelea quelea*	Red-billed Quelea	LC
Podicipedidae	*Tachybaptus ruficollis*	Little Grebe	LC
Pycnonotidae	*Pycnonotus tricolor*	Dark-capped Bulbul	LC
Rallidae	*Fulica cristata*	Red-knobbed Coot	LC
Rallidae	*Gallinula chloropus*	Common Moorhen	LC
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt	LC
Scolopacidae	*Gallinago nigripennis*	African Snipe	LC
Scolopacidae	*Tringa nebularis*	Common Greenshank	LC
Scopidae	*Scopus umbretta*	Hamerkop	LC
Sturnidae	*Lamprotornis bicolor*	Pied Starling	LC
Threskiornithidae	*Bostrychia hagedash*	Hadeda Ibis	LC
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	LC
Threskiornithidae	*Threskiornis aethiopicus*	African Sacred Ibis	LC
Turdidae	*Turdus litsitsirupa*	Groundscraper Thrush	LC
Viduidae	*Vidua macroura*	Pin-tailed Whydah	LC
Zosteropidae	*Zosterops capensis*	Cape White-eye	LC

LC=Least Concern; VU=Vulnerable; EN= Endangered; NT=Near Threatened; TOPS=Threatened or Protected Species

Although not directly confirmed during the field assessment in December 2020, a pair of Grey Crowned Cranes (*Balearica regulorum*), were previously sighted by the previous landowners in Portion 13 of the farm Paardeplaats 380 JT. The landowner at the time also reported that the pair would regularly visit/reside on the site (pers. comm. Mr Wilkie 15 December 2020). These Cranes are a Red Listed species and are listed as Endangered (BirdLife International, 2021). This species is not a migratory species although has been known to make use of variable local and seasonal movements depending on food availability. They nest in solitary pairs and are generally found in wetlands such as marshes, pans and dams with tall emergent vegetation. Its' diet primarily consists of insects, frogs, lizards, crabs and is known to feed on the seed heads of sedges. The species population has been threatened by the loss and degradation of wetland breeding areas through drought-related changes in land-use. Impacts include cultivation, overgrazing, heavy use of agricultural pesticide, declines in fallowing practices, high sedimentation rates, uncontrolled fires, and changes in the hydrological regimes (BirdLife International, 2021). Unsolicited harvesting (egg-collecting and hunting) and indirect disturbances from the hunting of larger animals and ducks in wetlands has prompted the decline in their numbers. The numerous pans and wetlands within the integrated Paardeplaats Project area provide ideal habitat for this species.

The wetland systems are earmarked with high ecological functioning and act as important dispersal corridors for many of the terrestrial bird species. Areas with facultative wetland flora (*Imperata cylindrica, Helicotrichon turgidulum* and *Arundinella nepalensis*) provide potential breeding and foraging habitats for SCC, in particular the African Grass Owl (VU) and African Marsh Harrier (EN). These areas are confined to wetland communities and structurally reminiscent of open grasslands. The artificial dams conform to an interconnected system of dams and water bodies with high seasonal variability among each other in terms of water levels. Therefore, it is anticipated that these systems experience an influx of species at the varying water levels and changes in season. They also provide refuge for large congregations of waterfowl.

11.2.5.1.2 Herpetofauna

Herpetofauna is defined as reptiles and amphibians inhabiting a given area. Reptiles are ectothermic (cold-blooded) meaning they are organisms that control body temperature through external means. As a result, reptiles are dependent on environmental heat sources. Due to this, many reptiles regulate their body temperature by basking in the sun, or in warmer areas. Substrate is an important factor determining which habitats are suitable for which species of reptile. According to Carruthers (2001), a number of factors influence the distribution of amphibians, but because amphibians have porous skin they generally prosper in warm and damp habitats. The presence of suitable habitat within the area (wetland and grassland areas) provides a number of different species of amphibians.

The brevity of the survey meant that relatively few reptiles were observed compared to that of mammals and birds. During the field assessment, three amphibian species were identified within the wetland, pan and dams, via its call and by direct sightings, and included the Sand Frog (*Tomopterna sp.*) and the Boettger's Caco (*Cacosternum boettgeri*) (both Least Concern) (**Table 11.7**). The Boettger's Caco is abundant in grassy areas, and it can breed in almost any small, temporary water body such as pools in inundated grasslands, culverts and other rain-filled depressions. Its predominant prey is mosquitos, and it is prey to the Yellow-billed Egret (*Ardea intermedia*) and the Giant African Bullfrog (*Pyxicephalus adspersus*) (Scott, 2021).

Table 11.7: Recorded Herpetofauna Species within the Integrated Paardeplaats Section.

SPECIES	FARM PORTION
Sand Frog	13/380 JT
Boettger's Caco	13/380 JT

The observed species diversity for both reptiles and amphibians was considerably low. The weather during the field survey was wet and overcast, this may have hindered the presence of herpetofauna

(specifically reptile) species within the area. Nevertheless, the large AIP stands, and large areas of previously disturbed grasslands contribute to the decreasing reptile diversity. There is no current explanation for the low species composition of amphibians as numerous water bodies and systems were found throughout the area.

11.2.5.1.3 Invertebrates

Invertebrates are the main components of faunal diversity in grasslands, playing substantial roles in ecosystem processes including nutrient cycling and pollination. Grassland invertebrate communities are heavily dependent on plant diversity and production within a given system (Barnett and Facey, 2016). During the field survey in December 2020, a total of 34 invertebrates were observed in the greater area and are listed in **Table 11.8**.

Table 11.8: Recorded Invertebrate Species within the Integrated Paardeplaats Section.

COMMON NAME	SPECIES NAME	CONSERVATION STATUS
Freshwater crab	*Potamonautes flavusjo*	LC
Red pumpkin beetle	*Aulacophora foveicollis*	LC
Garden fruit chafer	*Pachnoda sinuata*	NE
Hook-winged net-winged beetle	*Lycus melanurus*	NE
Spotted cucumber beetle	*Diabrotica undecimpunctata*	LC
Gaudy commodore	*Precis octavia sesamus*	LC
Marsh Sylph	*Metisella meninx*	VU
European Beewolf	*Philanthus triangulum*	LC
African honeybee	*Apis mellifera scutellata*	LC
Orange plume moth	*Stenodacma wahlbergi*	LC
Garden acraea butterfly caterpillar	*Acraea horta*	LC
Two-spotted ground beetle	*Anthia thoracica*	LC
Mountain white spot moth caterpillar	*Mesocelis montana*	LC
Cherry spot moth caterpillar	*Diaphone eumela*	LC
Paper wasp	*Polistes marginalis*	LC
Cleg fly	*Haematopota spp*	LC
Brown Veined White Butterfly	*Belenois aurota*	LC
Navy dropwing (female)	*Trithemis furva*	LC
Tussock Moth Caterpillar	*Laelia sp.*	LC
Black vine weevil	*Otiorhynchus sulcatus*	LC
Red legged tick	*Rhipicephalus evertsi evertsi*	LC
Grass stick insect	*Maransis rufolineatus*	LC
Blue emperor	*Anax imperator*	LC
Snouted harvester termites	*Trinervitermes*	LC

COMMON NAME	SPECIES NAME	CONSERVATION STATUS
Grasshopper (with striped hind leg)	*Vitticatantops humeralis*	LC
Grasshopper (with yellow spots)	*Ochrophlebia cafra*	LC
Velvet spider	*Dresserus spp*	LC
Spider wasp	*Hemipepsis*	LC
Robber fly	*Gonioscelis ventralis*	LC
Grass moth	*Ancylolomia spp*	NE
Short-tailed Ichneumon Wasp	*Enicospilus*	LC
Geranium Bronze	*Cacyreus marshalli*	LC
Black miliipede	*Doratogonus*	LC
Twig wilter	*Anoplocnemis spp.*	LC

LC=Least Concern; VU=Vulnerable; EN= Endangered; NT=Near Threatened; DD=Data Deficient

11.3 Freshwater Ecosystems

11.3.1 Biophysical Attributes

11.3.1.1 Freshwater Bioregional Context

The D 2809 road area is located within the Southern Temperate Highveld freshwater ecoregion, which is delimited by the South African interior plateau sub-region of the Highveld aquatic ecoregion, of which the main habitat type, in terms of watercourses, is regarded as Savannah-Dry Forest Rivers. Aquatic biotas within this bioregion have mixed tropical and temperate affinities, sharing species between the Limpopo and Zambezi systems. The Southern Temperate Highveld freshwater ecoregion is considered to be bio-regionally outstanding in its biological distinctiveness and its conservation status is regarded as Endangered. The ecoregion is defined by the temperate upland rivers and seasonal pans (Nel et al., 2004; Darwall et al., 2009; Scott, 2013).

11.3.1.2 Associated Aquatic Ecosystems

The National Water Resource Strategy (NWRS-1) originally established 19 Water Management Areas (WMAs) within South Africa and proposed the establishment of the 19 Catchment Management Agencies (CMAs) to correspond to these areas. In rethinking the management model and based on viability assessments with respect to water resources management, available funding, capacity, skills and expertise in regulation and oversight, as well as to improve integrated water systems management, the original 19 designated WMAs have been consolidated into nine WMAs.

The D 2809 road area is located predominantly within the newly revised Olifants WMA, which now also includes the Letaba River catchment. Accordingly, the main rivers include the Elands River, the Wilge River, the Steelpoort River, the Olifants River, and the Letaba River. The Olifants River

originates to the east of Johannesburg and flows in a northerly direction before gently turning to the east. It is joined by the Letaba River before it enters into Mozambique. A small portion of the road area fall within the Inkomati-Usuthu WMA.

The road area is located within the upper reaches of the B41A quaternary catchment, with a portion within the Inkomati-Ushutho WMA area located within the upper reaches of the X11D quaternary catchment (**Figure 11.13**). The watercourses associated with the proposed road realignment comprise several non-perennial watercourses, and more specifically various wetland systems. Watercourses drain west into the Skilferlaagtespruit, which flows into the Grootspruit (sub-quaternary B41A-01025) and, after its confluence with the Langspruit (sub-quaternary B41A-01002), it becomes the Steelpoort River.

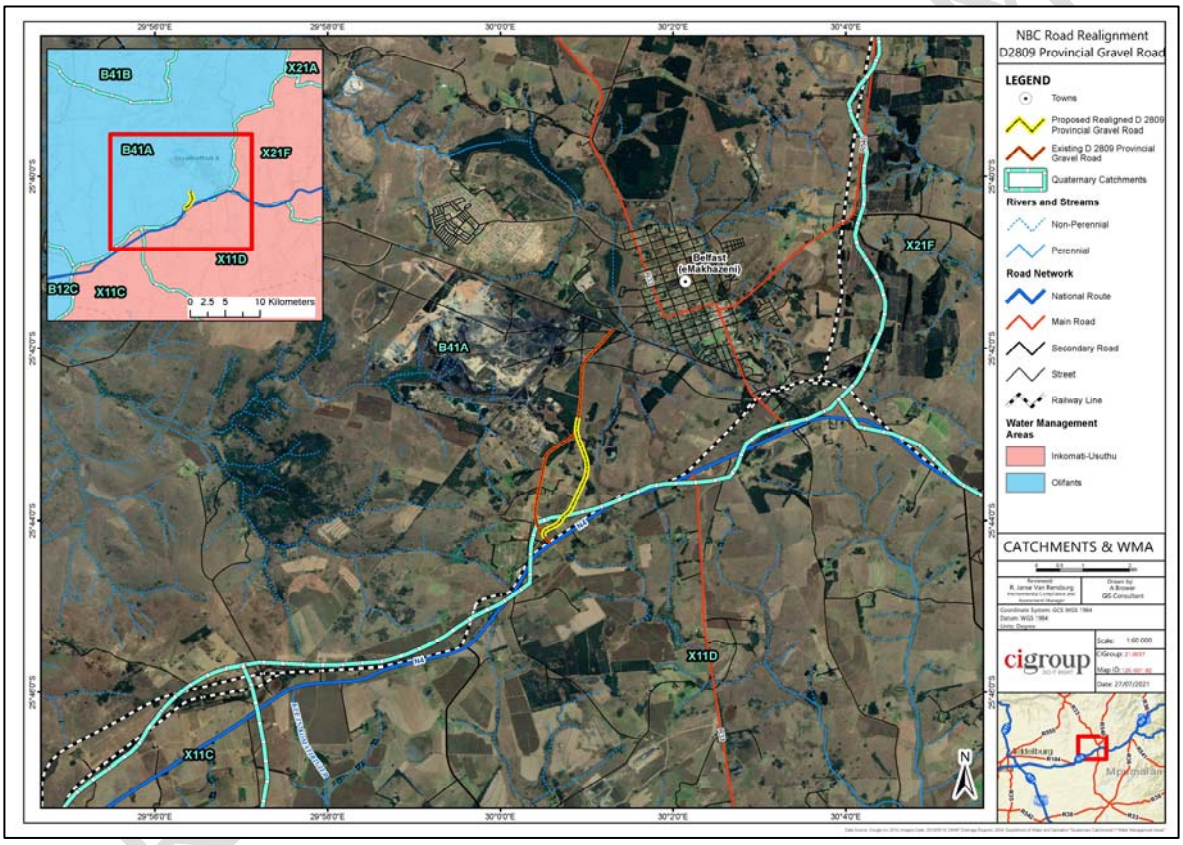

Figure 11.13: WMA and Quaternary Catchments.

11.3.1.3 National Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) project represents a multi-partner project which aims to identify Freshwater Ecosystem Priority Areas (FEPAs) to meet national biodiversity goals for freshwater ecosystems and to develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

Based on current outputs of the NFEPA project (Nel et al., 2011; **Figure 11.14**), the proposed road realignment is situated within a single FEPA catchment. The FEPA catchment is designated as such on the basis of the catchment being considered a fish sanctuary for two species of fish, namely *Enteromius anoplus* (Chubbyhead Barb) and *Opsaridium peringueyi* (Southern Barred Minnow), and two river ecosystem types, namely Permanent/Seasonal Highveld Mountain and Upper Foothill streams. The surrounding area directly west of the proposed realignment is classified as Fish Support Area, also for *Enteromius anoplus* (Chubbyhead Barb) and *Opsaridium peringueyi* (Southern Barred Minnow).

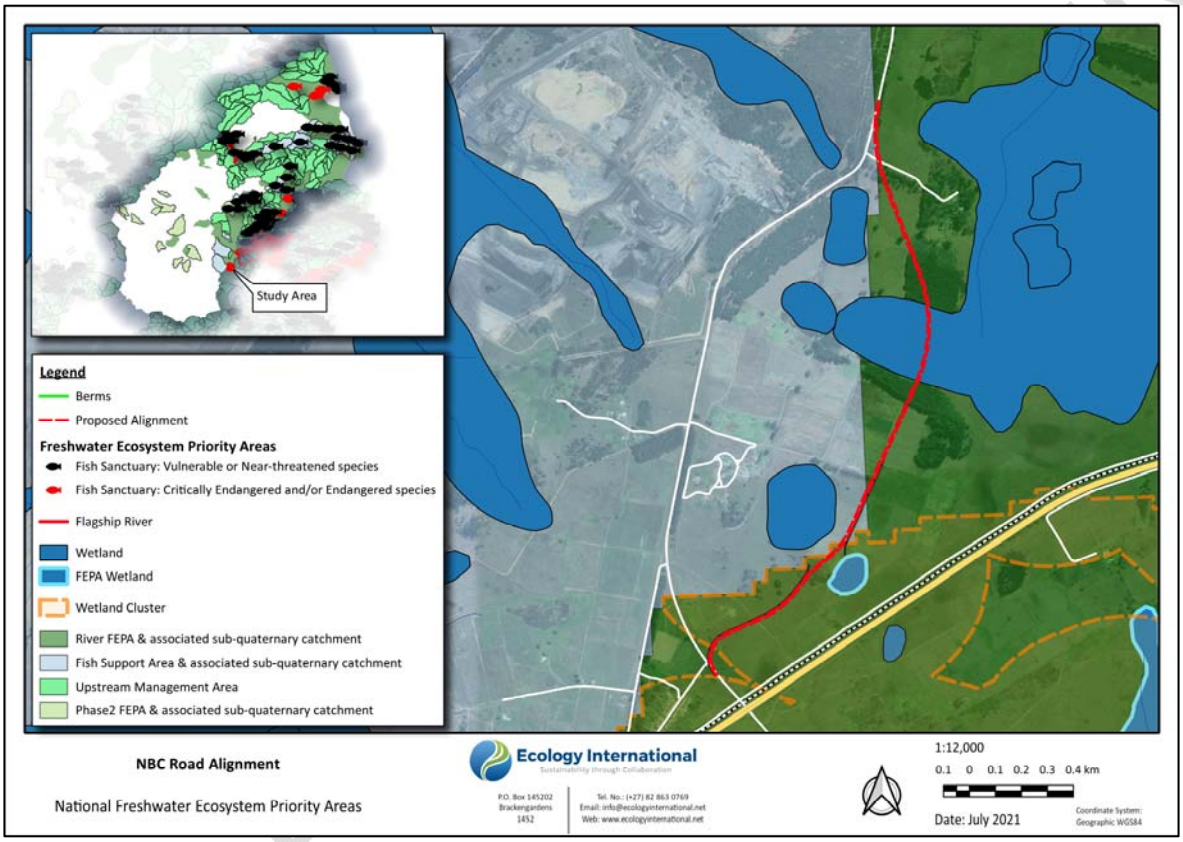

Figure 11.14: National Freshwater Ecosystem Priority Areas.

SANBI recently undertook a wetland mapping exercise for the Mpumalanga Highveld region in order to expand on the detailed wetland delineations undertaken in adjacent catchments, for inclusion into the NFEPA project (Mbona *et al.*, 2015). Mpumalanga Tourism and Parks Agency (MTPA) recognises that wetlands are specialised systems that perform various ecological functions and play an integral role in biodiversity conservation. The project sought to map the extent, distribution, condition and type of freshwater ecosystems in the Mpumalanga Highveld coal belt. The delineations were based on identifying wetlands on Spot 5 imagery within the Mpumalanga Highveld boundary and supported by Google Earth imagery, 1:50 000 contour lines, 1:50 000 river lines, data from previous studies in the area, and data from the original NFEPA wetlands layer.

Hydrogeomorphic (HGM) units were identified at a desktop level and confirmed by means of ground-truthing. According to Mbona et al. (2015), while various wetland areas were noted to be associated with the study area, only one wetland unit, classified as a depressional wetland and associated with a larger wetland cluster, was identified as a FEPA wetland based on the revised wetland mapping inventory for the Mpumalanga Highveld region (**Figure 11.14**). The southern portion of the proposed road realignment falls within the aforementioned wetland cluster area.

11.3.1.4 Mpumalanga Biodiversity Sector Plan

A systematic conservation plan for Mpumalanga was published as the Mpumalanga Biodiversity Sector Plan (Mpumalanga Tourism and Parks Agency, 2014), with the aim to maintain biodiversity conservation targets. In the plan, the most important habitat categories to be taken into consideration in any environmental assessment process are:

- Critical Biodiversity Areas (CBAs): Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes. These need to be kept in a natural or near-natural state, with no further loss of habitat or species. This category is split into:
    - CBA Irreplaceable Areas: These areas are required to meet biodiversity pattern and/or ecological processes targets. They are further subdivided into:
        - Irreplaceable: representing the only localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved, i.e. there are no alternative sites available; and
        - High Irreplaceable: representing areas of significantly high biodiversity value, but there are alternate sites within which the targets can be met for the biodiversity features contained within, but there are not many;
    - CBA Irreplaceable Linkages: These are areas within landscape corridors that, due to modification of the natural landscape, represent the only remaining and highly constrained linkages which, if lost, would result in the breakage of the large corridor network as a whole. Their conservation is vital in maintaining the linkage of the corridor and its associated biodiversity related processes;
    - CBA Optimal Areas: Areas selected to meet biodiversity pattern and/or biodiversity process targets. Alternative sites might be available to meet biodiversity targets. These areas can, furthermore, support suitable habitat for red and orange listed faunal and floral species;
- Ecological Support Areas (ESAs): Areas determined to be functional but not necessarily entirely natural areas, which are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs. Mpumalanga distinguishes following categories related to biodiversity outside protected areas:

- ESA Species Specific: Areas required for the persistence of specific species. They may be modified, but a change in current land use to anything other than rehabilitated land, would most likely result in a loss of that species from the area identified; and
- ESA Corridors: These facilitate ecological and climate change processes and to create a linked landscape for the conservation of species within a fragmented landscape.

According to the latest revision of the freshwater component of the provincial biodiversity sector plan (Mpumalanga Tourism and Parks Agency, 2019), the D 2809 road area is primarily associated with Heavily Modified and Ecological Support Areas (**Figure 11.15**).

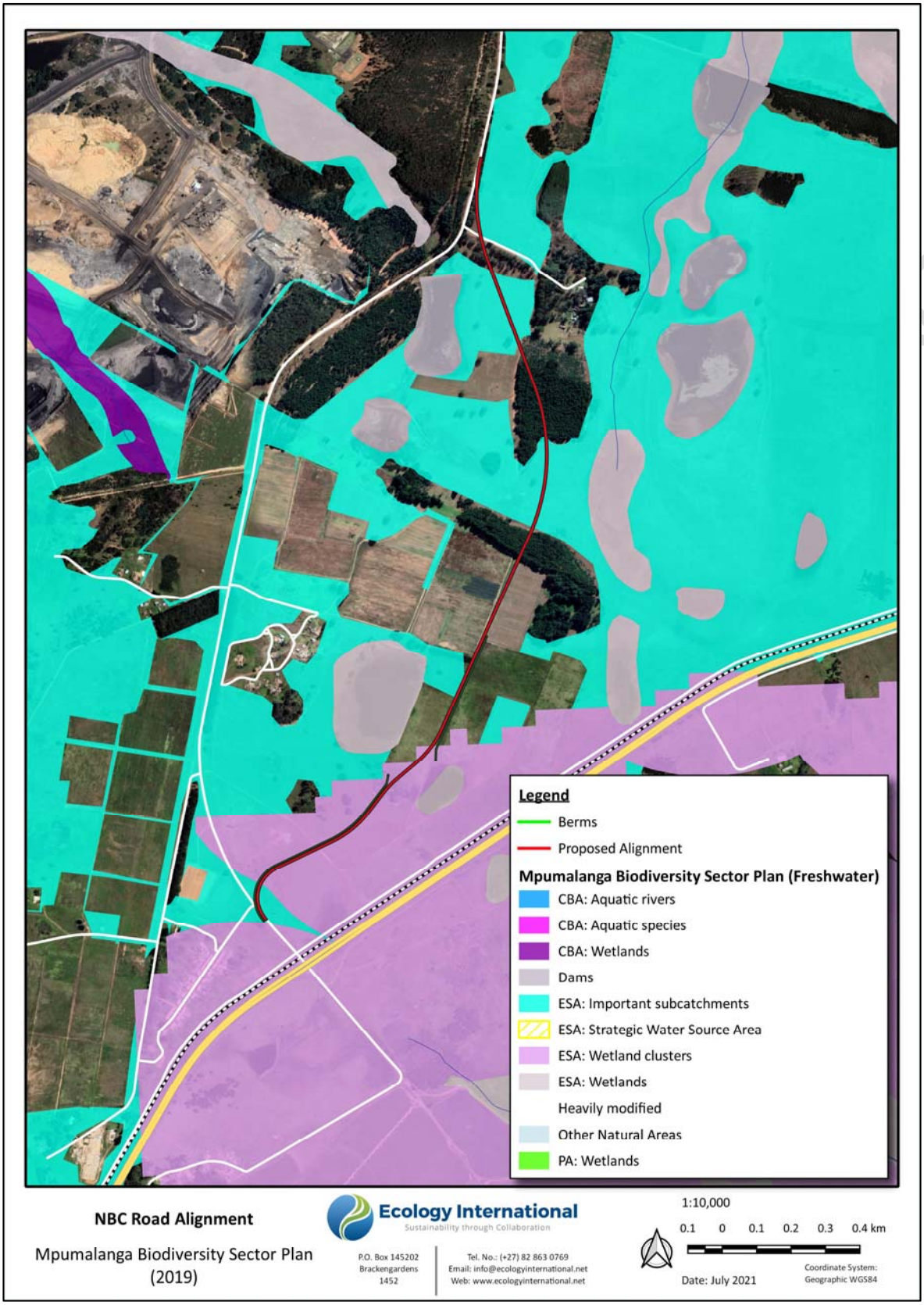

Figure 11.15: Mpumalanga Biodiversity Sector Plan (2019).

11.3.2 Wetland Ecosystem Assessment

11.3.2.1 Wetland Delineation

The wetland delineations, data analysis and interpretation as presented by Ecology International (2021) were used in the compilation of the wetland risk assessment required for the proposed road realignment project. Wetland areas associated with the proposed road realignment as well as those within the 500 m zone of regulation were considered (**Figure 11.16**).

11.3.2.2 System Characterisation

The watercourses within the D 2809 road area were classified according to the classification system (Ollis et al., 2013) as Inland Systems, falling within the Highveld Aquatic Ecoregion, and the Mesic Highveld Grassland Group 4 Wetland Vegetation Type (Mbona et al., 2015). These watercourses were further classified at Level 3 and Level 4 of the classification system as summarised in **Table 11.9**.

Table 11.9: Characterisation of the Watercourses.

LEVEL 3: LANDSCAPE UNIT	LEVEL 4: HGM TYPE
Valley floor: the base of a valley, situated between two distinct valley side-slopes, where alluvial or fluvial processes typically dominate.	Unchanneled valley-bottom wetland: a valley-bottom wetland without a river channel running through it.
Slope: an inclined stretch of ground typically located on the side of a mountain, hill or valley, not forming part of a valley floor. Includes scarp slopes, mid-slopes and foot-slopes.	Hillslope seep: a wetland located on gently to steeply sloping land and dominated by colluvial (I.e., gravity-driven) unidirectional movement of water and material down-slope.
Plain: an extensive area of low relief, generally characterized by relatively level, gently undulating or uniformly sloping land with a very gentle gradient that is not located in a valley.	Depression/pan: an inland aquatic ecosystem with closed or near-closed elevation contours, which increases in depth, and within which water typically accumulates.

Eighteen (18) hydro-geomorphic (HGM) units (**Figure 11.16**) were identified within the vicinity of the proposed road realignment and its associated 500 m zone of regulation comprising various unchanneled valley bottom wetlands, hillslope seep wetlands (including a sheet rock wetland), and depressions/pans. Furthermore, five (5) impoundments were observed. The various HGM units identified were further assessed, the results of which are presented in the sections that follow. The impoundments, while mapped and indicated in **Figure 11.16** were regarded as artificial systems and were thus not subjected to further analysis in terms of the WET-Health, WET-Ecoservices, and Ecological Importance and Sensitivity tools.

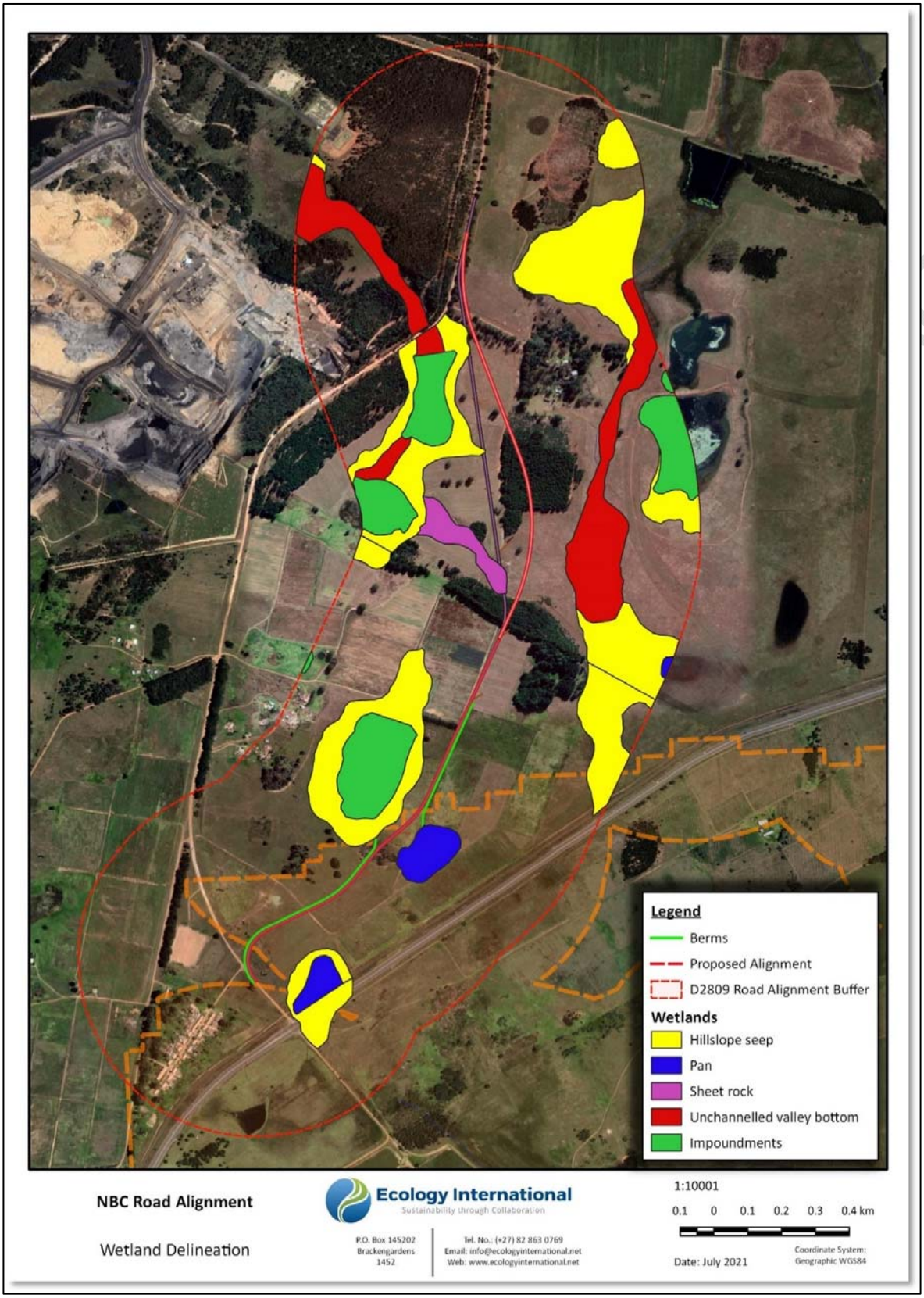

Figure 11.16: Wetlands/Watercourses within the D 2809 Road Area.

11.3.2.3 Present Ecological State

The health of a wetland can be defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition (Macfarlane et al., 2009). The wetlands associated with the proposed road realignment and its associated 500 m zone of regulation have been impacted by a long history of agricultural and recreational land uses as well as impacts related to mining.

The major impacts to the wetlands/watercourses identified through the health assessments can be summarised as follows:

- Numerous impoundments were observed within the 500 m zone of regulation and the affected wetlands have been impacted in terms of the geomorphology as well as water quality due to the presence of trout dams on these systems. Further, deep and shallow flooding by the observed impoundments has resulted in severe alterations to the natural wetting regimes.
- Historical plantations and infestations of *Acacia mearrnsii* (Wattle), *Populus x canescens* (Poplars) and *Eucalyptus sp.* (Bluegums) have resulted in impacts to the wetlands present with alterations to the natural water retention and distribution profiles of the wetlands present, as well as impacts to subsurface water supply.
- Historical cultivation has impacted the integrity of the natural vegetation and resulted in an increased potential for impacts to water quality and increased sediment loads within the catchment.
- The presence of linear infrastructure such as roads and powerlines has resulted in fragmentation of the wetlands in some areas, alterations to the natural water retention and distribution profiles, altered vegetation structure, and disruptions to the natural flow paths.

The identified wetlands were assessed according to the WET-Health methodology as described by Macfarlane et al. (2008) and were broadly classified as Largely Natural (Category B), Moderately Modified (Category C), and Largely Modified (Category D). The results of these assessments (Ecology International, 2021) are presented graphically in **Figure 11.17**.

11.3.2.4 Wetland Ecological Service Provision

The general features of each HGM unit were assessed in terms of function, and the overall importance of the HGM unit was then determined at a landscape level. The systems associated with the proposed road realignment and its associated 500 m zone of regulation may be regarded as of Intermediate to Moderately High (**Figure 11.18**) importance in terms of service provision and functionality.

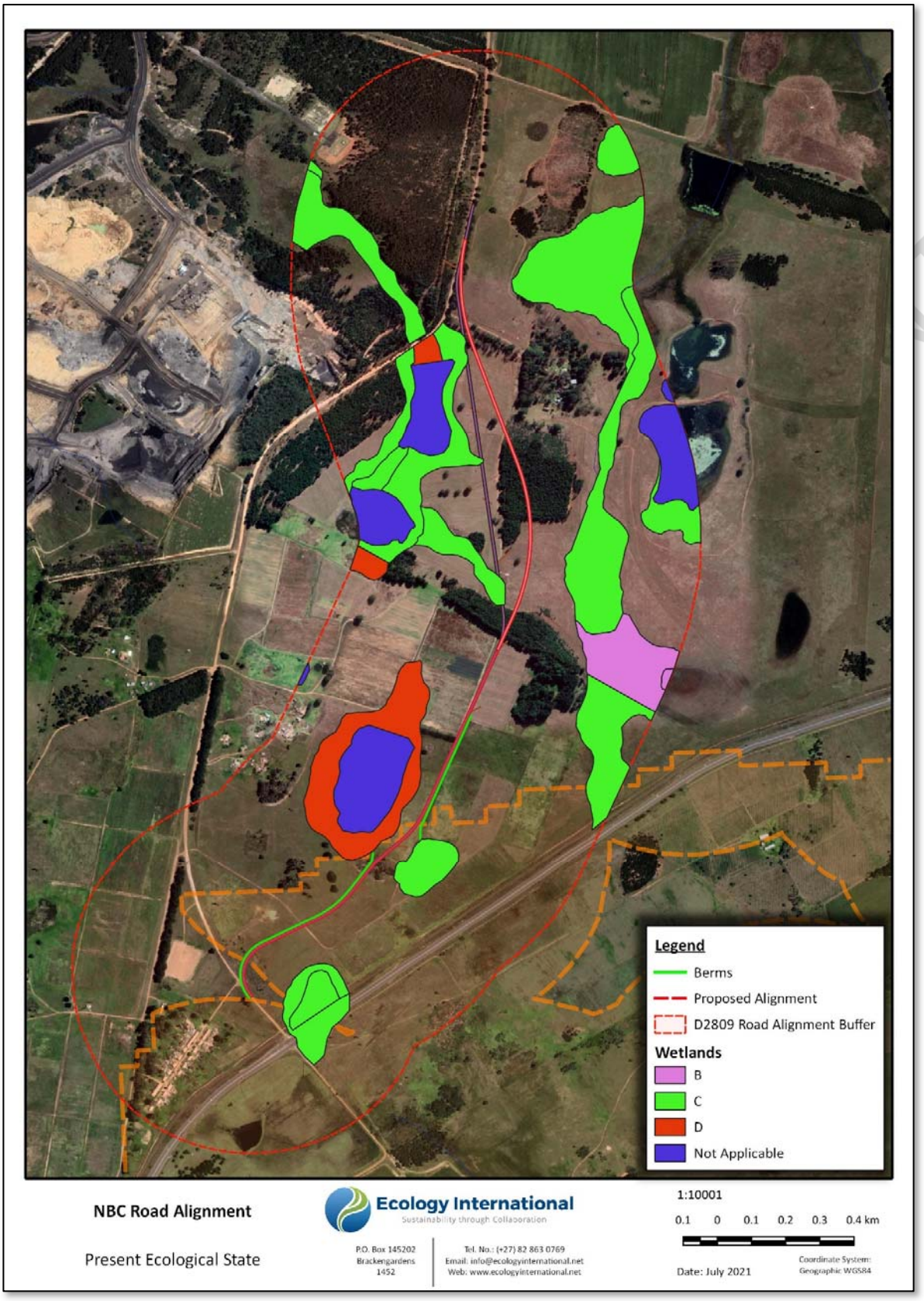

Figure 11.17: The Present Ecological State of the Wetlands/Watercourses Along the D 2809 Road Area.

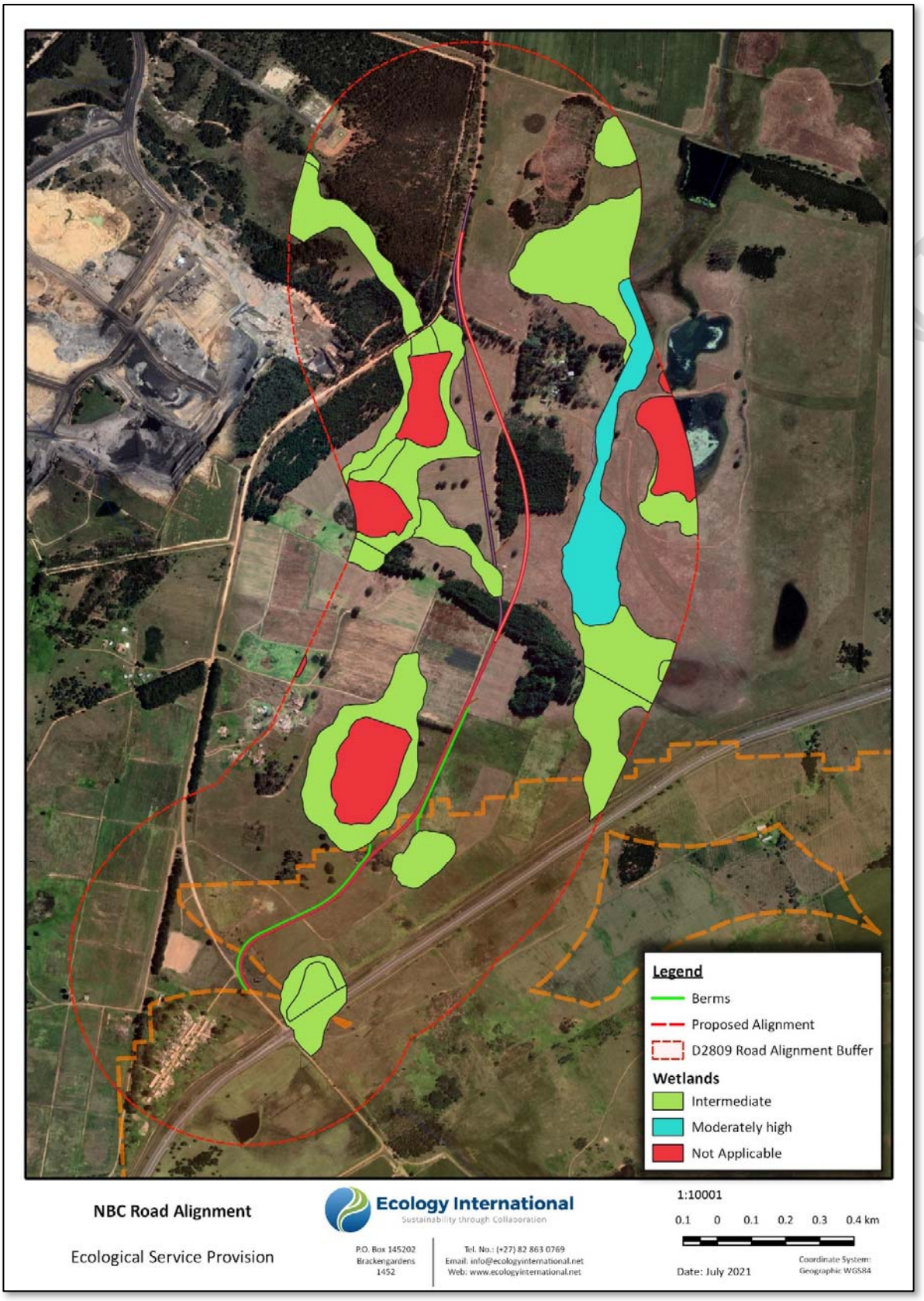

Figure 11.18: The Ecological Service Provision of the Wetlands/Watercourses Along the D 2809 Road Area.

Key services provided are generally related to streamflow regulation, sediment trapping and the assimilation of toxicants and nutrients from the surrounding land use activities. Biodiversity maintenance is regarded as high to very high across almost all the HGM units indicating the importance for conservation of these systems as well as their role in the provision of habitat and natural migration corridors. Erosion control and flood attenuation services were also generally regarded as important services, albeit to a lesser extent.

11.3.2.5 Ecological Importance and Sensitivity

Ecological Importance and Sensitivity for each wetland was evaluated in terms of:

- Ecological Importance;
- Hydrological Functions; and
- Direct Human Benefits.

The wetlands associated with the proposed road realignment and its associated 500 m zone of regulation were regarded as of Moderate and High Ecological Importance and Sensitivity (**Figure 11.19**), being important in terms of ecological importance (biodiversity maintenance) and their hydrological functions. Direct human benefits were related to the provision of water for agropastoral activities, as well as for recreational use and tourism (i.e., Trout fishing and birding opportunities), however, these were generally associated with the valley bottom systems rather than with the hillslope seeps.

11.3.3 Buffer Zones and No-Go Areas

Buffer zones associated with water resources have been shown to perform a wide range of functions and have been proposed as a standard measure to protect water resources and associated biodiversity on this basis. These functions can include (Macfarlane & Bredin, 2016):

- Maintaining basic aquatic processes;
- Reducing impacts on water resources from upstream activities and adjoining land uses;
- Providing habitat for aquatic and semi-aquatic species;
- Providing habitat for terrestrial species; and
- A range of ancillary societal benefits.

Given that the application is for a road realignment (linear infrastructure), the application of buffer zones is of limited value in this scenario. However, it is strongly recommended that all activities associated with the proposed project remain outside of the delineated wetland boundaries.

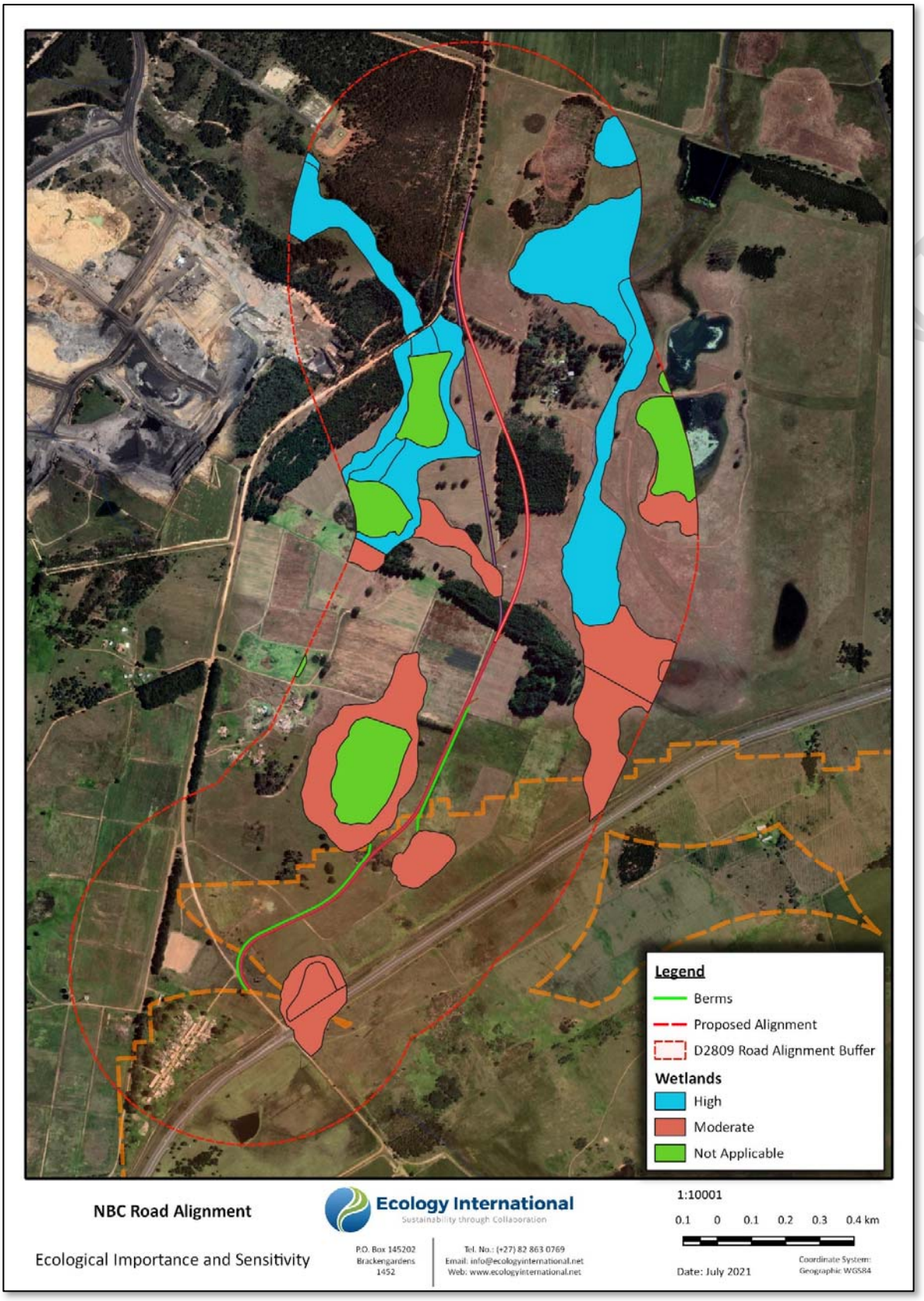

Figure 11.19: The Ecological Importance and Sensitivity of the Wetlands/Watercourses Along the D 2809 Road Area.

11.4 Surface Water

The D 2809 road area is located in a hilly area at an altitude of approximately 1,855 - 1,920 mamsl. The site area is in the upper catchment region of the Steelpoort River, Grootspruit and Langspruit (**Figure 11.20**).

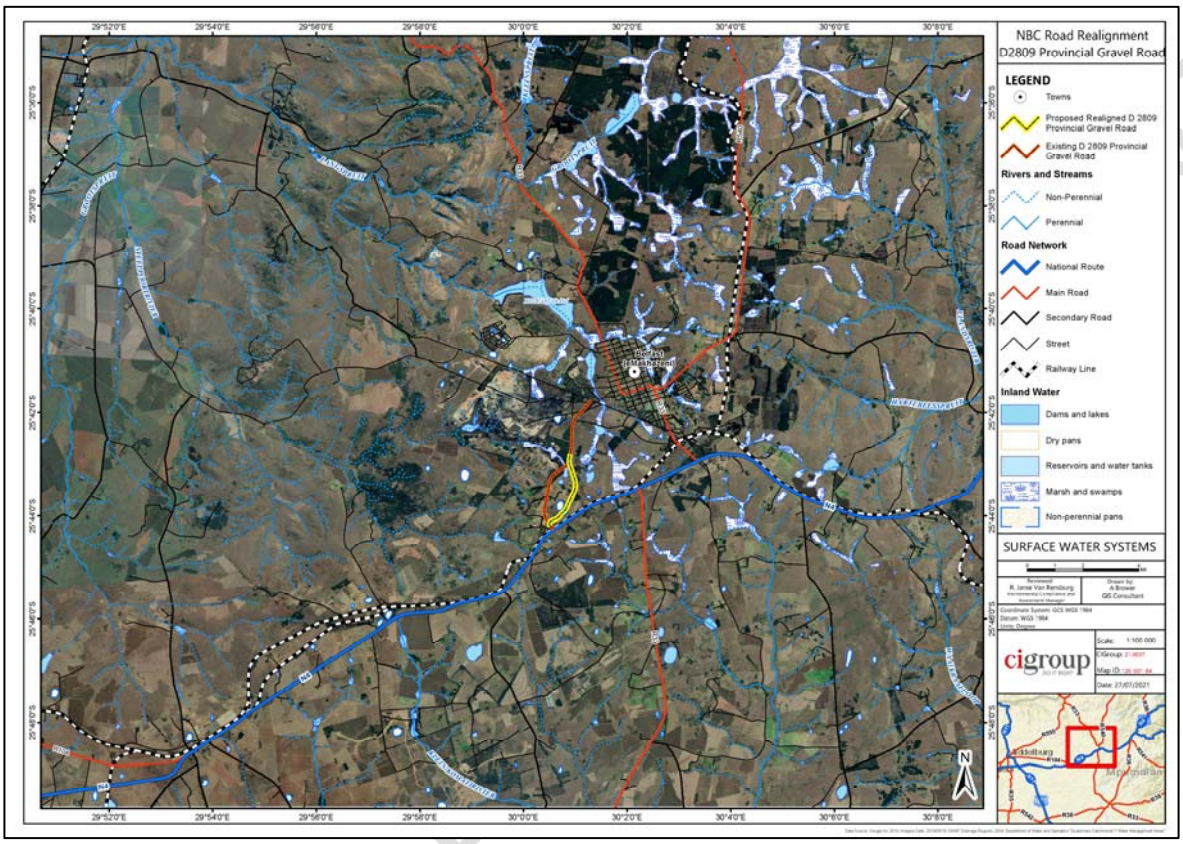

Figure 11.20: Surface Water of the D 2809 Road Area.

11.1 Groundwater

According to the 1:500 000 Hydrogeological map series 2530 Nelspruit (Du Toit et al., 1999) the D 2809 road area is underlain by an intergranular and fractured type of aquifer with an average borehole yield ranging between 0.1 and 0.5 litres per second (l/s). The road area is characterised by secondary aquifers with groundwater usually located in fractures, joints, bedding planes and within the weathered zone formed in the Ecca Group. Little to no flow occurs in the rock matrix of the Ecca Group.

11.1 Heritage

The greater road is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). Quaternary superficial deposits are the youngest geological deposits formed during

the most recent period of geological time (approximately 2.6 million years ago to the present). Most of the superficial deposits are unconsolidated sediments which may include stream, channel and floodplain deposits, beach sand, talus s and glacial drift sediments (Partridge *et al*, 2006). Quaternary fossil assemblages are generally rare and low in diversity and occur over a wide-ranging geographic area.

In 2012, a total of 32 heritage sites (PP 1 – PP 32) including 21 heritage structures, 7 cemeteries, 3 areas with historical mining shafts, and one possible rock art site were identified within the Paardeplaats Section of the NBC mine. In May 2021 an additional 13 heritage sites (PP 33 – PP 45) were identified within the same area and on Portion 24. Of these sites only eight (8) sites occur within the greater road area, of which five (5) occur along the proposed new road. The location of identified heritage sites is presented in **Figure 11.21**.

Figure 11.21: Identified Heritage Features within the D 2809 Road Area.

The proposed road realignment was assessed in the field in July 2021. The aim of the survey was to specifically address the recommendations made by SAHRA and the proposed road realignment was assessed in detail as a result (**Figure 11.22**).

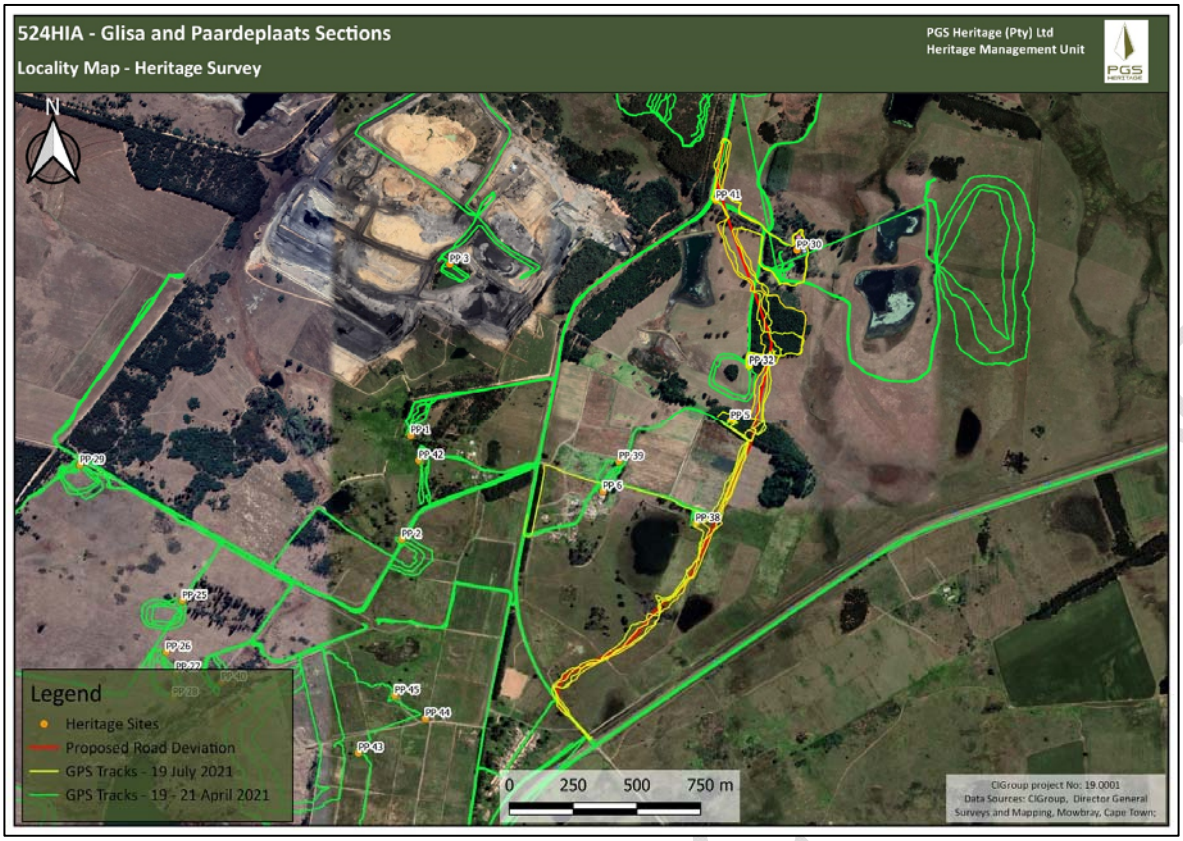

Figure 11.22: D 2809 Road Area Fieldwork Tracks.

All previously identified sites located in proximity to the road realignment were also visited to establish the actual boundaries of these sites. During the fieldwork, no new heritage sites were identified within the proposed road realignment. The detailed description of the heritage features identified 2012 and 2021, together with a distance description from the road realignment, is presented in **Table 11.10**.

11.2 Palaeontology

A Palaeontological Desktop Assessment (PDA) was undertaken in May 2021. The road realignment is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). According to the South African Heritage, Resources Information System (SAHRIS) the road realignment is located in an area with Very High sensitivity (red), as such the Palaeontological Sensitivity of these rocks is Very High (**Figure 11.23**).

Table 11.10: Heritage Sites Identified within the D 2809 Road Area.

2012 DESCRIPTION	2021 DESCRIPTION	DISTANCE FROM ROAD REALIGNMENT FOOTPRINT
PP 5 – Burial Ground		
An informal cemetery with ±40 graves was identified at this location. The cemetery is not fenced and is located amongst a plantation of blue gum trees. Most of the graves are overgrown with grass and other vegetation.	It seems that more graves are present with ±40 – 50 noted currently. The site is located next to a blue gum plantation and is overgrown with vegetation.	The closest distance between the proposed road realignment and the actual boundary of site PP 5 is approximately 68 m.
PP 30 – Historic Homestead		
A farmstead with its associated buildings was identified at this location. The main house and other buildings are still intact and are still being occupied. The main house has been extended over the years and several extensions are visible and are all done in the same architectural style as the original building. According to the owner, Mr. Wilkie, the house is more than a hundred years old. The house has many different features and a detailed study by a heritage architect would be necessary to document them all. A second, more modern, house is situated opposite the original old house. According to the owner, Mr. Wilkie, this house is more than 60 years old. The house has internal electrical and plumbing systems. A storeroom or shed with farm implements was also identified. It has an external electrical system. Another storeroom or shed is situated next to the first shed. This building is in a rather poor state and more recent brick and cement supports had been placed there to extend the life of the building.	The site was found to consist of the remains of an abandoned farmstead with several buildings and a stone kraal. It appears as if the site has been abandoned for some period as the site is overgrown with vegetation. The main house and other buildings are intact and are currently unoccupied. The main house has been extended over the years and several extensions are visible. Two storerooms or sheds were also identified. The buildings are built with sandstone blocks and mortar and are located next to each other. The roof of one of the sandstone buildings has collapsed. Since the farmstead appears to be unoccupied, access could not be gained through the locked gate and electric fence.	The closest distance between the proposed road realignment and the actual boundary of site PP 30 is approximately 70 m.

2012 DESCRIPTION	2021 DESCRIPTION	DISTANCE FROM ROAD REALIGNMENT FOOTPRINT
PP 32 – Historic Homestead and Structures with the Possible Risk for Unmarked Graves		
The remains of another mud-brick homestead were identified at this location. The remains of the mud-brick homestead consist of the foundations of four square structures and a circular structure. The structures are all placed around a central Lapa area. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site. Past experience has shown that in some cases stillborn babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available.	The site was found to consist of the remains of a mudbrick homestead, with only some of the foundations visible on site. The site is overgrown with vegetation. No additional information regarding the presence (or not) of such graves is currently available.	The closest distance between the proposed road realignment and the actual boundary of site PP 32 is approximately 61 m.
PP 38 – Reservoir with Associated Structures		
-	The site consists of a collapsed reservoir associated with a single brick building. Both the reservoir and brick building are younger than 60 years.	The closest distance between the proposed road realignment and the actual boundary of site PP 38 is approximately 50 m.
PP 41 – Small tone Structure		
-	The remains of a small, square structure were identified at this location. The structure was built with stone and cement and measures approximately 4 x 4 m in size. It has no roof and has only one entrance with no windows. The function and age of this structure are unknown. A section of one wall has broken away.	The closest distance between the proposed road realignment and the actual boundary of site PP 41 is approximately 25 m.

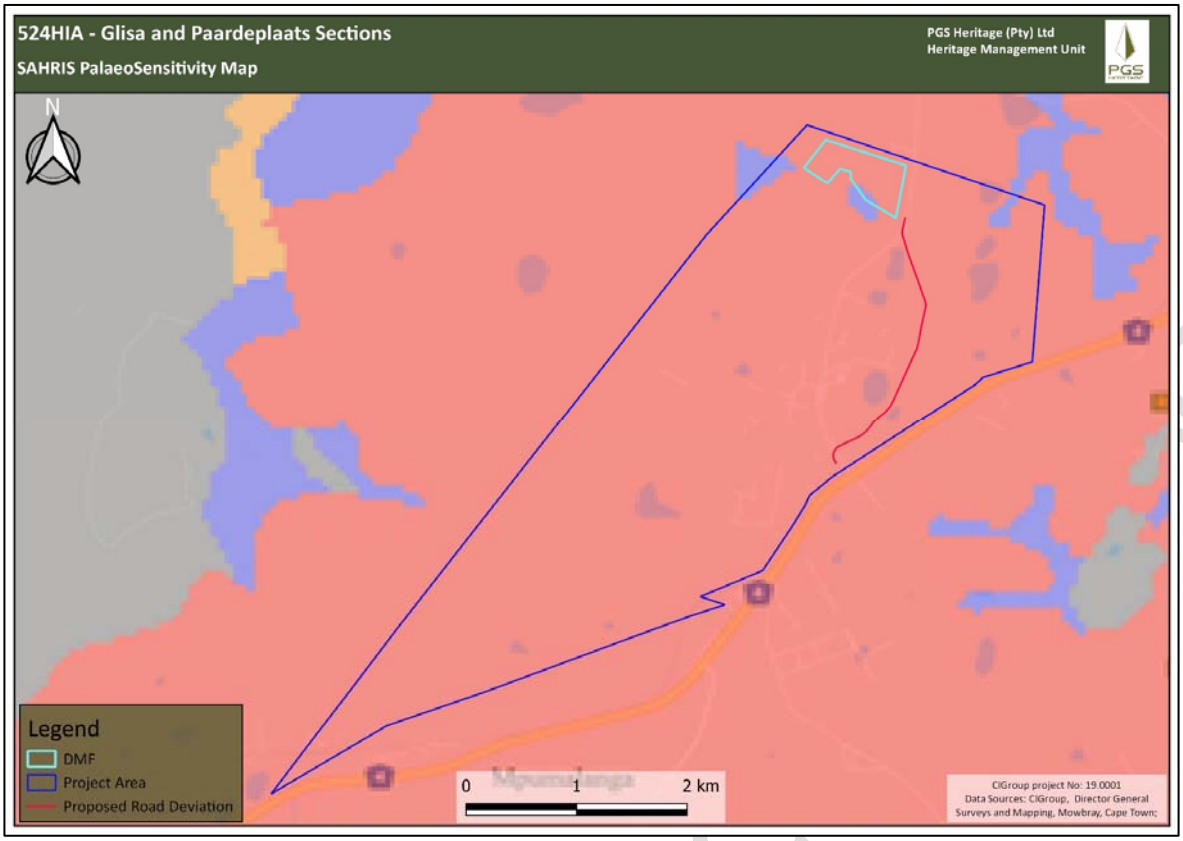

Figure 11.23: D 2809 Road Area SAHRIS Palaeontological Sensitivity.

11.1 Socio-Economic Environment

11.1.1 Regional Context

The D 2809 road area is located in the eMakhazeni LM which forms part of the Nkangala DM in Mpumalanga Province of South Africa. Mpumalanga lies in eastern South Africa, north of KwaZulu-Natal and bordering Swaziland and Mozambique. It constitutes 6.5% of South Africa's land area. In the north it borders on Limpopo, to the west Gauteng, to the southwest the Free State and to the south KwaZulu-Natal. The capital is Mbombela. Mpumalanga Province is divided into three DMs, which are further subdivided into 17 LMs.

The Nkangala DM is one of the three DMs in Mpumalanga. Local municipalities forming part of the Nkangala DM are Delmas, Dr JS Moroka, EMalahleni, eMakhazeni, Steve Tshwete, and Thembisile, as well as the Mdala District Management Area. The district is approximately 17,000 square kilometre (km^2) and consists of about 165 towns and villages, with EMalahleni and Middelburg being the primary towns. The Nkangala DM has a population of approximately 1.1 million people, which constitutes almost a third of Mpumalanga's population. The Nkangala DM is at the economic hub of Mpumalanga and is rich in minerals and natural resources.

11.1.2 Local Context

11.1.2.1 Demographics

According to the 2011 census, Mpumalanga recorded a population size of 4 039 939, ranking it sixth out of the nine provinces, of which, 90.65% are Black Africa, 7.51% are White, 0.91% are Coloured, 0.69% are Indian or Asian and the remaining 0.24% are other (**Figure 11.24**) (Stats SA, 2018\1). In 2011 census, the dominant home language in the eMakhazeni LM was SiSwati (28.35%), followed by IsiZulu (21.77%), isiNdebele (18.75%), and Afrikaans (10.66%).

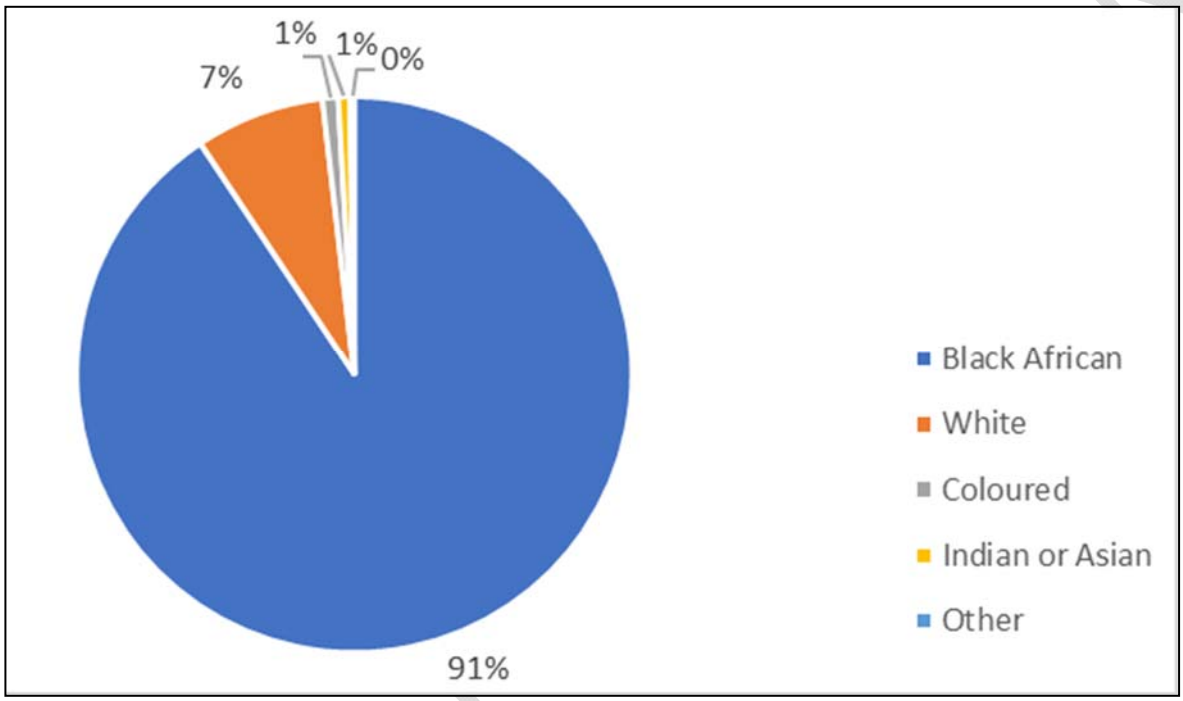

Figure 11.24: Population Groups (Stats SA, 2011).

The eMakhazeni LM is at the heart of the Mpumalanga province and is bordered by the Greater Groblersdal, Thaba-Chweu, Steve Tshwete, Albert Luthuli, and Mbombela Local Municipalities. The municipality is strategically located between the Pretoria/Johannesburg complex in Gauteng and Nelspruit in Mpumalanga and is situated on the N4 Maputo corridor. The dominant economic activity in the area is farming (IDP, 2020). Farming occupies the largest part of the physical area. There are a number of small towns in the area that serve as service centres for the agricultural sector, namely:

- eMakhazeni (Belfast) and Siyathuthuka;
- Dullstroom and Sakhelwe;
- Entokozweni (Machadodorp) and Emthonjeni;
- Waterval-Boven and Emgwenya.

The district's economy is dominated by electricity, manufacturing, and mining. Community services, trade, finance, transport, agriculture, and construction are also important sectors. Nkangala's Integrated Development Plan (IDP) states that the district has extensive mineral deposits, including chrome and coal.

The majority of the population is men with 51.4% (**Figure 11.25**). The most spoken language in the eMakhazeni LM is isiZulu (35.7%), followed by IsiNdebele (25.1%) and Afrikaans (15.7%).

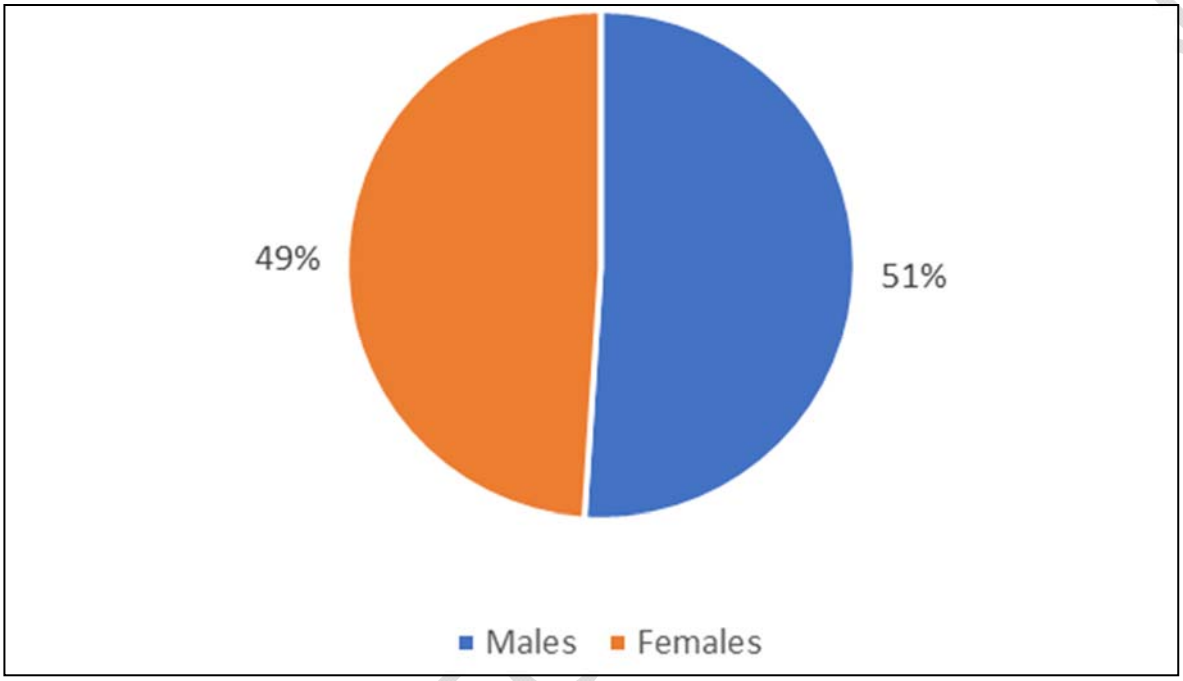

Figure 11.25: Sex (Stats SA, 2011).

11.1.2.2 Education

Education is a major challenge in the area as about 30% of children in the area of school-going age do not have access to quality education (IPD, 2020). This is due to the rural nature of the area. The majority of schools are farm schools which are multi-graded, and that lack quality infrastructure and adequate human resources. The majority of primary schools are on the NSNP (National Schools Nutrition Programme), and the municipality welcomes the proposal of the Department of Education to extend the programme to high schools. There is only one tertiary education facility in the area, namely a FET College at Emgwenya. **Table 11.11** gives a summary of the number and type of schools in the eMakhazeni LM (IDP, 2020).

Table 11.11: Summary of schools in the eMakhazeni Local Municipality.

TYPE OF SCHOOL	NUMBER
Primary Schools (Farms)	7
Primary Schools (Farms)	13
Secondary Schools	5
Secondary Schools (Farms)	4
Private Schools	4
Schools for learners with special education needs	4
FET	1
Total	**35**

11.1.2.3 Employment

The main industry of employment in Mpumalanga as well as in the eMakhazeni LM is Manufacturing, Community, social and personal services and Wholesale and retail trade. The Community, social and personal services sector includes public administration and defence activities, education and health and social work. Other large employment sectors in the Emakhazeni LM are Wholesale and retail trade and Manufacturing. The pattern of overall unemployment rate in eMakhazeni has changed as compared to 2001 where the LM wase at 30% and in 2011, it was at 25.92 percent. Employment opportunities are favourable in the municipality, particularly for males, about 80% of males and 66% females were employed in 2011.

Figure 11.26 shows employment status for the population in the economically active group (15 to 65 years old) and further indicate that there has been a reduction in the percentage of unemployed in the district between 2001 and 2011 for both males and females. The decline is similar for males and females, although employment remains higher for males than for females.

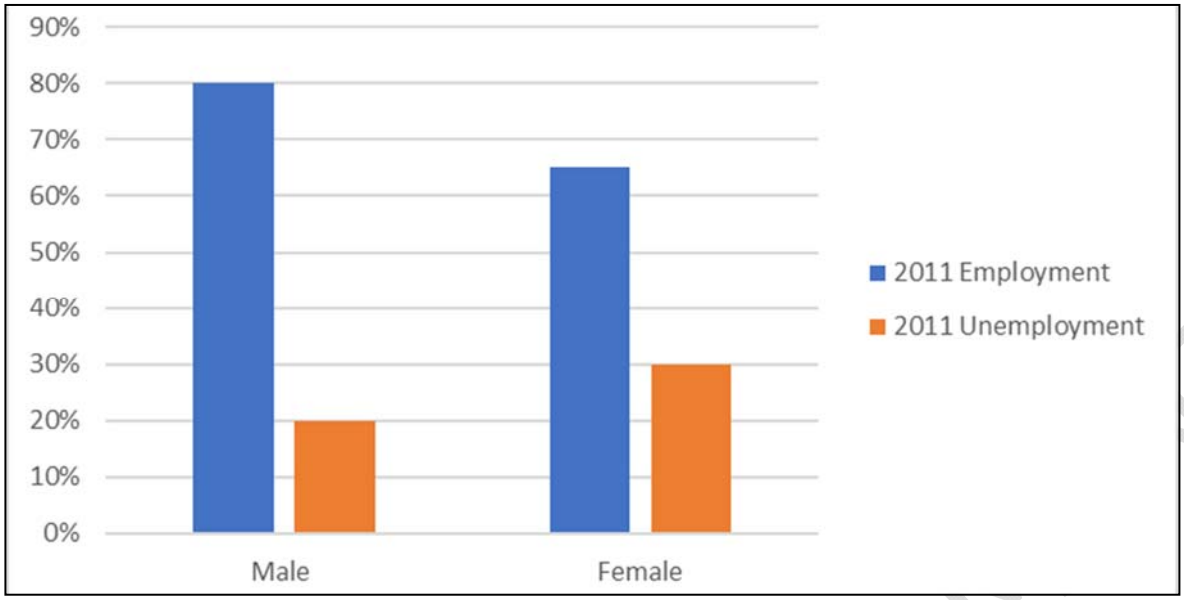

Figure 11.26: Employment status (StatsSA 2011).

11.2 Current Land Cover

Figure 11.27 presents the current land cover map with important environmental features.

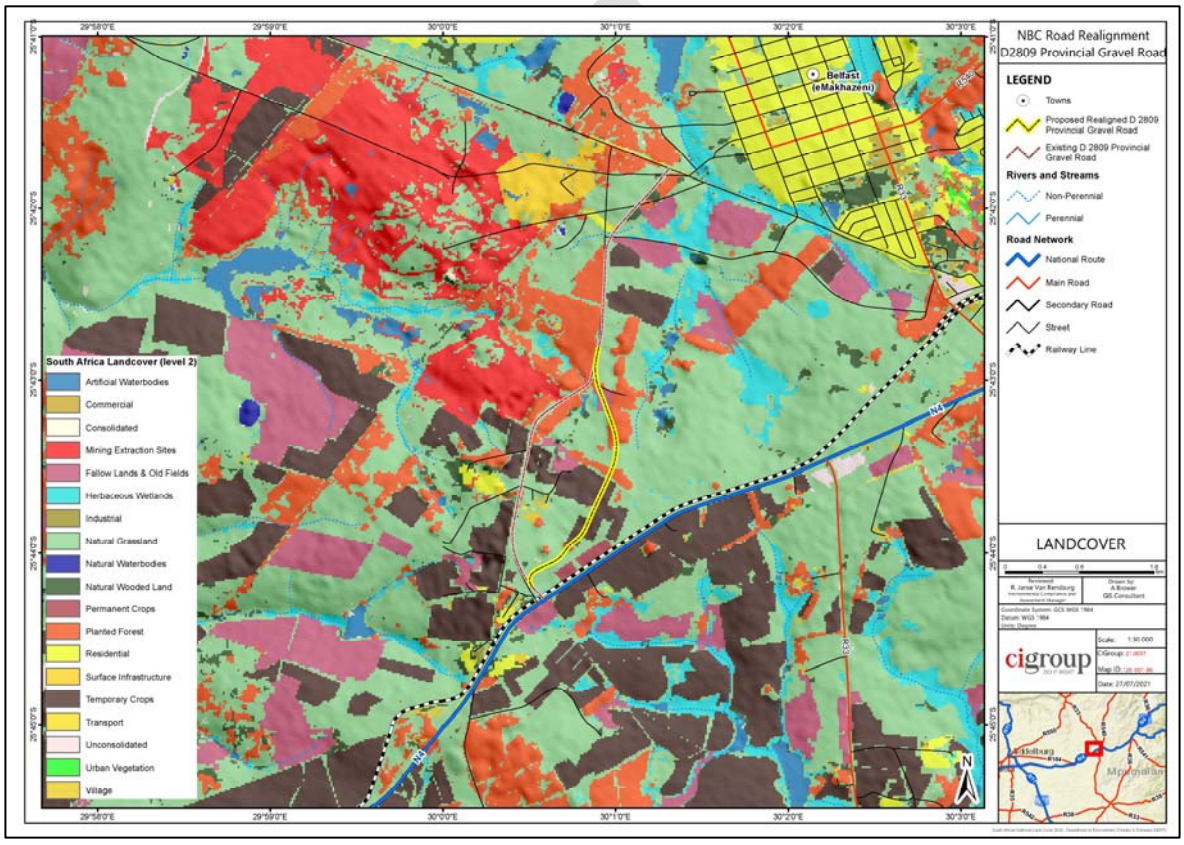

Figure 11.27: Land Cover.

12 IMPACT ASSESSMENT METHODOLOGY

To ensure uniformity, the assessment of potential impacts has been addressed in a standard manner so that a wide range of impacts are comparable. CIGroup employ a risk-based approach when undertaking the impact assessment and the ranking. CIGroup's risk-based approach makes use of a typical risk matrix in the 5 x 5 configuration (**Figure 12.1**), which considers likelihood and consequence into the analysis of the potential impact risk.

Reporting Matrix		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
5	Almost certain					
4	Likely					
3	Moderate					
2	Unlikely					
1	Rare					

Figure 12.1: Risk-Based Reporting Matrix.

Risk-Based Approach - Before Mitigation

The likelihood of an impact occurring is determined by assessing the frequency of the activity, the frequency of the impact, the extent to which the activity is regulated and the ability to detect the occurrence of the impact, according to the criteria in **Table 12.1** – **Table 12.4**. The consequence of an impact is determined by assessing the spatial scale, duration, and severity, according to the criteria in **Table 12.5** – **Table 12.7**. The significance is then determined and assigned either a low, medium, or high significance.

Table 12.1: Frequency of the Activity.

DESCRIPTION	RATING
Annually or less	1
6-monthly	2
Monthly	3
Weekly	4
Daily	5

Table 12.2: Frequency of the Impact.

DESCRIPTION	RATING
Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

Table 12.3: Legal Regulation.

DESCRIPTION	RATING
No guidelines, standards, or legislation	3
Covered by guidelines, standards, or legislation	1

Table 12.4: Detection.

DESCRIPTION	RATING
Immediately	1
Without much effort	2
Needs some effort	3
With major effort	4
Remote or difficult to detect	5

Table 12.5: Spatial Scale.

DESCRIPTION	RATING
Area specific (at impact site)	1
Entire site (entire project area)	2
Local (5 km of site)	3
Regional / neighbouring areas (5 – 50 km of site)	4
National	5

Table 12.6: Duration.

DESCRIPTION	RATING
One day to one month (immediate)	1
One month to one year (Short term)	2
One year to 10 years (medium term)	3
Life of the activity (long term)	4
Beyond life of the activity (permanent)	5

Table 12.7: Severity.

DESCRIPTION	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful / within a regulated sensitive area	5

Impact Mitigation Actions

After the likelihood, consequence and significance determinations, impact mitigation actions are proposed. In the NEMA EIA Regulations, 2014, mitigation means "to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible." For this reason impact mitigation actions, which strive to align with impact management outcomes identified through the EIA process, are impact specific for all phases of a project.

Risk-Based Approach –After Impact Mitigation Action Determination

At this point, the likelihood and consequence are re-assessed in terms of the criteria presented in **Table 12.1** – **Table 12.7**, considering the impact mitigation actions proposed. Through this process the analysis of the potential impact risk following impact mitigation action implementation is determined. The significance is the re-assessed to determine whether the mitigation measures and action plans proposed serve to lessen the significance of the identified impact.

Risk-Based Approach Visual Representation

CIGroup's risk-based approach further plots the identified impacts before mitigation in the corresponding single square on the Risk-Based Reporting Matrix. The purpose of the impact mitigation action determination is to identify ways to move impacts from the top right (almost certain and catastrophic risk) in the Risk-Based Reporting Matrix Without Mitigation to the bottom left (insignificant and rare risk) in the Risk-Based Reporting Matrix After Mitigation as illustrated in **Figure 12.2**. In this way, the risks associated with each impact with or without impact mitigation action implementation can be visually presented and will easily show how, through the implementation of appropriate impact mitigation actions, the likelihood and consequence of identified impacts can be improved.

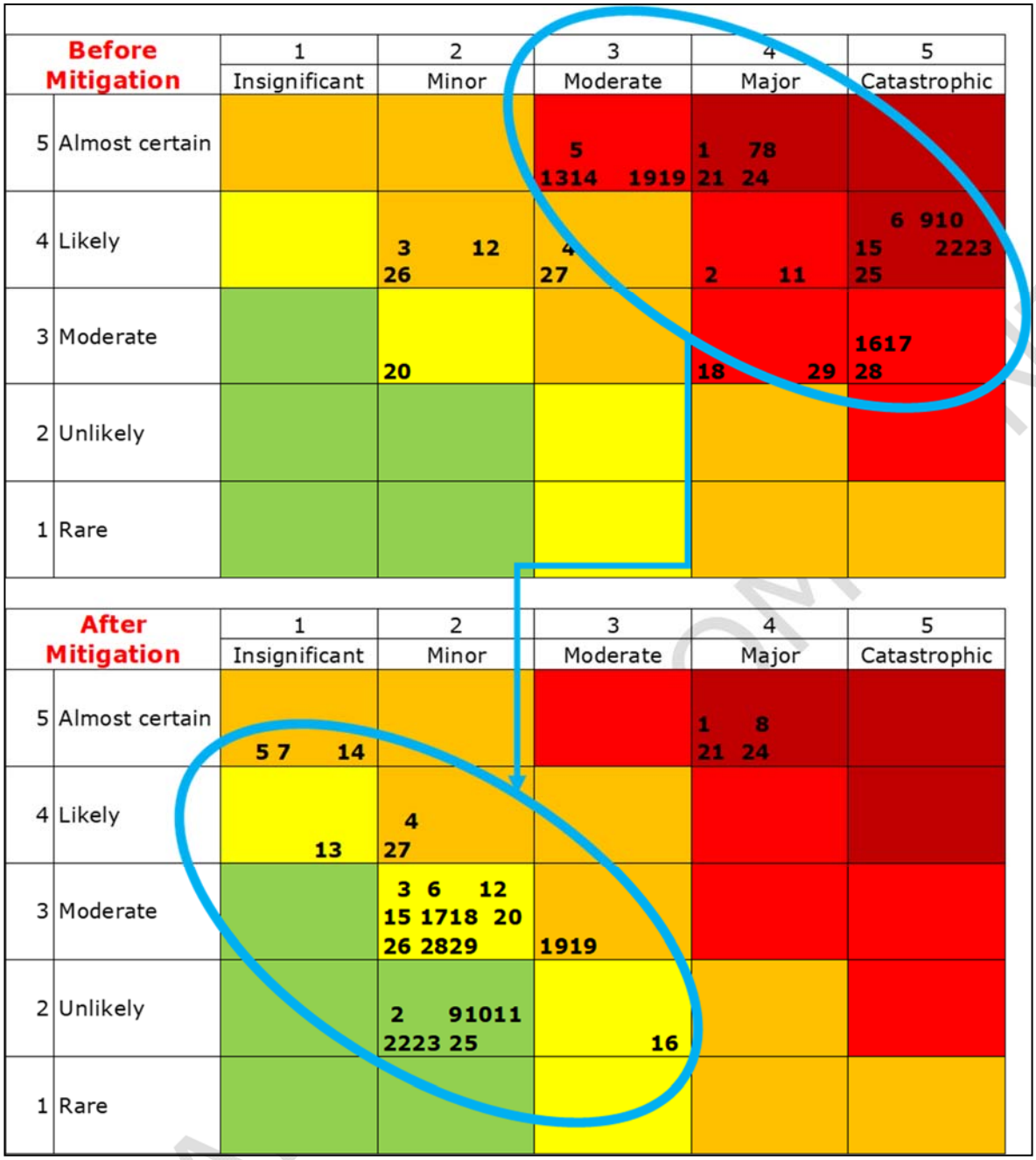

Figure 12.2: Risk-Based Reporting Matrix – Before and After Mitigation.

13 IDENTIFICATION OF IMPACTS

13.1 Summary of Impacts Identified

The impacts associated with the road realignment for the construction phase include the following:

- Air Quality:
  - Liberation of dust.
- Soil, Land Use and Land Capability:

- Loss of fertile topsoil;
- Soil surface compaction;
- Soil contamination;
- Terrain alterations;
- Agricultural potential loss; and
- Altered landscape.

- Heritage:
  - Impacts on graves and burial grounds, homestead and structures, historic farmsteads and structures and palaeontology;
  - Discovery of new graves; and
  - Accidental discovery of graves.
- Traffic:
  - Heavy traffic on adjacent road network;
  - Travel time;
  - Heavy vehicles on gravel roads; and
  - Road safety.
- Noise:
  - Noise nuisance.
- Visual:
  - Visual impact on sensitive receptors.
- Social:
  - Change in social dynamics;
  - Land use changes;
  - Traffic increases;
  - Safety and security;
  - Health impact;
  - Health and safety;
  - Sense of place; and
  - Labour.
- Surface Water:
  - Surface water siltation;
  - Surface water pollution;
  - Surface water drainage patterns and slopes altered;
  - Erosion and sedimentation entering receiving surface water bodies; and
  - Flooding risk.
- Groundwater:
  - Infiltration to groundwater system.
- Freshwater Ecosystems:

- Loss of wetland and aquatic habitat;
- Fragmentation of watercourses;
- Disturbance and degradation of wetland and aquatic habitat;
- Sediment transportation and deposition;
- Water quality deterioration;
- Increased surface water runoff;
- Invasive alien plant species encroachment; and
- Buffer zone impacts.

- Terrestrial Biodiversity:
  - Removal of vegetation and basal layer;
  - Increased proliferation of AIPs;
  - Increased faunal casualties;
  - Increased dust pollution;
  - Heavy machinery utilised increasing vehicle movement in the area, increasing soil compaction, habitat disturbances and vegetation removal;
  - Natural vegetation will be removed for the road construction promoting edge effects and AIP proliferation; and
  - Increased dust pollution and erosion.

The impacts associated with the road realignment for the operational phase include the following:

- Air Quality:
  - Liberation of dust.
- Soil, Land Use and Land Capability:
  - Soil surface compaction; and
  - Soil erosion.
- Heritage:
  - Encroachment on heritage sites due to maintenance activities.
- Traffic:
  - Traffic volumes and road safety.
- Noise:
  - Noise nuisance.
- Surface Water:
  - Sedimentation of surface water resources and wetlands due to runoff and wind erosion.
  - Infiltration to groundwater system.
- Freshwater Ecosystems:
  - Deterioration of water quality due to hydrocarbon spillages.

Table 13.1 presents the impact assessment applicable to the construction and operational phases for the proposed D 2809 Provincial Road realignment. **Table 13.2** presents the opportunities associated with the proposed D 2809 Provincial Road realignment.

Table 13.1: Impact Assessment.

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
CONSTRUCTION PHASE						
Air Quality						
Removal of topsoil	Liberation of dust	Dust-fall rates exceeding the residential guideline of 600 mg/m²/day.	Low	Dust suppression on all roads through the use of water sprayers or chemical stabilisers. Establish wind breaks where possible.	Low	Control
Heavy machinery and vehicle movement	Liberation of dust	Dust liberation as a result of vehicular and machinery use and movement.	Medium	Dust suppression on all roads through the use of water sprayers or chemical stabilisers. Exhaust pipes of vehicles should be directed so that they do not raise dust.	Low	Control
Road construction	Liberation of dust	Dust liberation as a result of construction activities.	Low	Dust suppression on all roads through the use of water sprayers or chemical stabilisers. Exhaust pipes of vehicles should be directed so that they do not raise dust.	Low	Control
Removal of vegetation	Liberation of dust	Dust liberation as a result of wind.	Low	Revegetation of exposed areas with indigenous vegetation as an erosion control option. Keep denuded areas moist or vegetated to lessen dust liberation.	Low	Remedy
Removal of topsoil	Liberation of dust	Dust liberation as a result of soil handling.	Medium	Handling of soil should be undertaken on less windy days.	Low	Manage
Soil, Land Use and Land Capability						
Removal of vegetation	Loss of Fertile topsoil	Loss of fertile topsoil due to vegetation clearance. Increased susceptibility to erosion due to removal of vegetation cover. Increased soil erosion due to vegetation clearance.	Medium	Retain maximum surface vegetation cover. Restrict vegetation clearance as far as possible. Restrict vegetation clearance to a minimum footprint area. Undertake vegetation clearance in as short a duration as possible.	Low	Manage
Road construction	Loss of Fertile topsoil	Loss or reduction in soil fertility due to activities connected to road construction.	Medium	Retain maximum surface vegetation cover. Restrict vegetation clearance to a minimum footprint area.	Low	Manage
Heavy machinery and vehicle movement	Soil surface compaction	Compaction of soil surface due to various activities and vehicular and machinery use and movement.	Medium	Restrict vehicular and machinery use and movement as far as possible.	Low	Control
Hydrocarbon, fuel or chemical handling and spillage	Soil contamination	Contamination of soil due to chemical or affected water spillages.	Medium	Implement correct procedures for chemical handling and storage to minimise spillages. Address chemical and water spillages promptly through accepted corrective actions.	Low	Control
Road construction	Terrain alterations	Alteration in prevailing terrain due to construction activities.	Medium	Keep excavation to minimum and avoid, where possible, wetlands and depression areas.	Low	Control
Removal of topsoil	Agricultural potential loss	Loss of soil with an arable agricultural potential due to the removal of soils.	High	Ensure that soil is correctly removed and retain topsoil.	Low	Manage

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Removal of topsoil	Altered landscape	Change in natural landscape due to soil removal.	Medium	Minimise changes to natural landscape as far as practically implementable.	Low	Manage
Heritage						
Road construction	Low significant sites impact	No impact is expected on low significant sites (PP 38, PP 39 & PP 41).	Medium	No mitigation required.	Low	Manage
Road construction	Graves and burial grounds impact	Impact on Graves and Burial Grounds (PP 5 & PP 31)	Medium	Ensure in situ preservation of these sites by establishing a 20 m buffer zone around such sites. Should in situ preservation not be possible then the following mitigation measures will apply: A grave relocation process must be undertaken. A detailed social consultation process, at least 60 days in length, consisting of the attempted identification of the next-of-kin in order to obtain their consent for the relocation. Bilingual site and newspaper notices indicating the intent of the relocation. Permits from all the relevant and legally required authorities. An exhumation process that keeps the dignity of the remains and family intact. An exhumation process that safeguards the legal rights of the families as well as that of the applicant. The exhumation process must be done by a reputable company well versed in the mitigation of graves.	Low	Control
Road construction	Homestead and structures impact	Impact on historic homesteads and structures with the possible risk for unmarked graves (PP 6 & PP 32).	Medium	Ensure in situ preservation of these sites by establishing a 20 m buffer zone around such sites. Should in situ preservation not be possible then the following mitigation measures will apply: A social consultation process to assess whether any local residents or the wider public is aware of the presence of graves at sites PP 6 & PP 32. Depending on the outcome of the social consultation process, three different outcomes would be the result, namely: Outcome 1: The social consultation absolutely confirms that no graves are located here. Outcome 2: The social consultation absolutely confirms that graves are located here. Outcome 3: The social consultation does not yield any confident results.	Low	Manage

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Road construction	Historic farmsteads and structures impact	Impact on historic farmsteads and historical structures (PP 30).	Medium	Ensure in situ preservation of these sites by establishing a 20 m buffer zone around such sites. Should in situ preservation not be possible then the following mitigation measures will apply: An architectural historical specialist must be appointed to undertake a specialist assessment of these sites. The recommendations made by the specialist must be implemented.	Low	Manage
Road construction	New graves discovery	Chance finds of a potential grave during construction.	Medium	All activities must be halted in the area of the discovery and a qualified archaeologist contacted. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.	Low	Stop
Road construction	New graves discovery	Accidental discovery of graves during construction.	Medium	Upon the accidental discovery of graves, a buffer of at least 20 m should be implemented. All activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains, a permit must be applied for from SAHRA and other relevant authorities. The local South African Police Services must immediately be notified of the find. Where it is recommended that the graves be relocated, a full grave relocation process that includes a comprehensive social consultation must be followed.	Low	Stop
Road construction	Palaeontology finds	Impact on paleontological (fossil) finds.	Medium	If fossiliferous material is found an appropriate palaeontological expert must be appointed so that the material can be thoroughly assessed, recorded and professionally excavated or sampled.	Low	Stop
Traffic						
Road construction	Heavy traffic on adjacent road network	An increase in traffic on the adjacent road network.	Low	All lanes must have minimum width of 4 m on approach to any intersection. Ensure that all roads are clearly marked and sign-posted with warning signs and speed limit signs as required.	Low	Control

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Road construction	Travel time	Changes in travel time.	Low	Establish alternative routes for travel until construction is completed.	Low	Remedy
Road construction	Heavy vehicles on roads	Additional heavy vehicles on roads.	Low	Enforce a speed limit to minimise vehicle entrained dust liberation. Dust suppression on all roads through the use of water sprayers or chemical stabilisers.	Low	Control
Road construction	Road Safety	Impact on road safety.	Medium	Provide road safety features, such as speed bumps, where practically implementable.	Low	Manage
Noise						
Road construction	Noise nuisance	Noise disturbance and noise nuisance at rural noise sensitive receptors	Low	Construction site yards should be located well away from noise sensitive areas adjacent to the development sites. All vehicles and equipment are to be kept in good repair. Activities, and particularly the noisy ones, are to be confined to reasonable hours during the day and early evening. Where possible, very noisy activities should not take place at night (between the hours of 20h00 - 06h00). Construction should be restricted to the period between 08h00 - 16h00. Particularly noisy equipment must be insulated. With regard to unavoidable noisy activities in the vicinity of noise sensitive areas, the contracting engineer should liaise with local residents on how best to minimise the impact. Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum. Staff working in areas where the 8-hour ambient noise levels exceed 75 dBA should wear ear protection equipment.	Low	Control
Road operation	Noise nuisance	Increase in noise nuisance	Medium	Comply with the road safety aspects of the road and keep safe distance from other vehicles. Keep within the road speed. Road to be maintained in a good order at all times.	Low	Manage
Visual						
Road construction	Visual impact on sensitive receptors	Day and night-time visual impact on the surrounding sensitive receptors	Low	Revegetate exposed areas as soon as possible after construction activities are complete.	Low	Remedy
Road construction	Visual on sensitive receptors	The visual impact of dust on the surrounding sensitive receptors	Low	Dust suppression techniques should be in place at all times during all phases. Limit site clearance to the smallest footprint area possible.	Low	Remedy

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
				As much vegetation as possible should be kept during site clearance. Revegetate exposed areas as soon as possible after construction activities are complete.		
Social						
Road construction	Change in social dynamics	Change in social dynamic of resident communities	Low	Employ local or existing labour as far as possible (within a 20 km radius). Avoid the establishment of camps or temporary accommodation for workers.	Low	Control
Road construction	Land use changes	Change in land use	Low	Educate landowners in terms of their rights and responsibilities prior to the project going ahead. Develop clear communication lines when consulting with affected landowners and their employees.	Low	Control
Road construction	Traffic increases	Increase in traffic and heavy machinery or vehicles on roads	Medium	Speed limits on the local roads surrounding the construction site should be enforced. Appropriate traffic management measures should be planned for and implemented, where practically possible.	Low	Manage
Road construction	Safety and security	Increase in crime	Medium	Safety and security measures must be implemented to avoid any increase in criminal activities within the area.	Low	Manage
Road construction	Health impact	Impact of dust fallout on the livelihoods of the agricultural community. Health impacts such as asthma, sinusitis, allergies and other respiratory diseases attributed to dust generation.	Medium	Undertake dust suppression on all roads through the use of water sprayers or chemical stabilisers. Effective monitoring of ambient air quality should be implemented.	Low	Control
Road construction	Health and safety	Overall health and safety risk of workers	Medium	HIV/AIDS awareness campaigns should be provided to all employees on a regular basis. The necessary safety precautions should be taken, and first aid supplies should be made available on site.	Low	Manage
Road construction	Sense of place	Change in sense of place	Medium	Existing community forums must serve as liaison between the affected stakeholders and the applicant and should focus on traffic, dust, noise and construction related concerns. Prevent dust liberation through the use of water sprayers or chemical stabilisers. Traffic calming measures should be put in place to minimise traffic noise.	Low	Manage
Road construction	Labour	Gender division of labour	Medium	Women must have equal employment opportunities. Salaries of women should be equal to that of men when undertaking the same job.	Low	Control

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Surface Water						
Removal of topsoil	Surface water siltation	Siltation of wetlands and water resources	Medium	Stabilise impacted soils and keep vehicle movement to designated access roads.	Low	Control
Heavy machinery and vehicle movement	Surface water pollution	Pollution of surface water due to spillages, seepages or leaks and improper waste handling, storage and disposal.	Medium	All hazardous substances must be stored and handled on impervious substrates and bunded areas that are able to contain potential spillage. Waste handling and storage facilities must be located away from surface water resources and drainage lines. All vehicles and equipment must be kept in good working order and regularly serviced. Should a spill occur then the incident management procedure of the contracting engineer should be followed.	Low	Control
Road construction	Surface water drainage patterns and slopes altered	The construction of the road and stormwater management infrastructure have the potential to alter the sites natural, pre-existing surface water drainage patterns influencing the volume of water that enters the receiving environment.	Medium	Areas should be sloped to allow for free runoff toward the receiving environment. Restrict the use of surface water.	Low	Control
Road construction	Erosion and sedimentation entering receiving surface water bodies	Alteration of the natural pre-existing surface water drainage patterns and slopes of the area may result in increased erosion and sedimentation which may enter receiving surface water bodies.	High	No development should occur within the 1:100 year flood line of any drainage line, unless authorised. Vegetation clearance and soil disturbances should be limited to the smallest footprint area possible and erosion control measures implemented. Movement of machinery and vehicles must be limited to identified roads and must avoid sensitive areas. Areas should be sloped to allow for free runoff toward the receiving environment.	Low	Manage
Road construction	Flooding risk	Due to the close proximity to wetlands and drainage lines the risk of flooding exists.	Medium	Monitor national and regional flood warning updates.	Low	Manage
Groundwater						
Removal of topsoil	Infiltration to groundwater system	Clearing topsoil for footprint areas can increase infiltration rates of water to the groundwater system.	Medium	Ensure that footprint clearance is kept to a minimum and that the area is not over-cleared.	Low	Manage
Hydrocarbon, fuel or chemical handling and spillage	Infiltration to groundwater system	Handling of waste and transport of building material can cause various types of spills (domestic waste, sewage water, hydrocarbons) which can infiltrate and contaminate of the groundwater system.	Low	Waste should be discarded in an allocated waste area. Spills should be cleaned up immediately. Solid waste must similarly either be stored at site on an approved waste disposal area or removed by credible contractors.	Low	Manage

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Freshwater Ecosystems						
Road construction	Loss of wetland and aquatic habitat.	Loss of wetland and aquatic habitat.	Low	Ensure that as far as possible that infrastructure is placed outside of delineated watercourse areas and their associated zones of regulation. Ensure that sound environmental management is in place during the construction phase. Design of infrastructure should be environmentally and structurally sound and all possible precautions taken to prevent spillage and/or seepage to the surface resources present. Limit the footprint area of the construction activities to what is absolutely essential in order to minimise impacts as a result of vegetation clearing and compaction of soils. Wetland areas should be fenced off and should be designated as No-go areas for all unauthorised personnel.	Low	Manage
Road construction	Fragmentation of watercourses.	Fragmentation of watercourses.	Medium	Pipe culverts are not to be allowed at any watercourse crossings to limit opportunities of flow confinement and channel incision of the wetland units and drainage lines.	Low	Manage
Removal of vegetation	Disturbance and degradation of wetland and aquatic habitat.	Disturbance and degradation of wetland and aquatic habitat.	Medium	Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation. All erosion noted within the project footprint should be remedied immediately and included as part of an ongoing maintenance plan. Active revegetation of denuded areas immediately after construction activities. Implement and maintain alien vegetation management programme. All delineated watercourses should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel, with the exception of approved construction areas. No vehicles or heavy machinery may be allowed to drive indiscriminately within any delineated watercourses. All vehicles must remain on demarcated roads and within the project footprint. No material may be dumped or stockpiled within delineated watercourses. A suitable dust control program should be put in place.	Low	Control

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Removal of topsoil	Sediment transportation and deposition	Increased sediment transport and deposition in wetland and aquatic habitat.	Medium	Measures must be put in place to attenuate water and reduce runoff. Attenuation measures during construction are to include but are not limited to - the use of sandbags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells which must be used in the protection of slopes. Delay vegetation clearing and clear only the minimum area required at any one time. Ensure soil management and stormwater management are implemented and maintained to minimise erosion and sedimentation. All erosion noted within the project footprint should be remedied immediately and included as part of an ongoing maintenance plan. Active revegetation of denuded areas immediately after construction activities. Ensure that no incision and canalisation of the wetland features present takes place as a result of the proposed activities. Erosion berms should be installed on roadways to prevent gully formation and siltation of the freshwater resources.	Low	Manage
Hydrocarbon, fuel or chemical handling and spillage	Water quality deterioration	Water quality deterioration.	Low	Ensure that as far as possible that all construction activities are placed outside of wetland/riparian areas and their associated 32 or 100 m zones of regulation, respectively. All vehicles must be regularly inspected for leaks. Vehicles are to be maintained in good working order so as to reduce the probability of leakage of fuels and lubricants. Storage of potentially hazardous materials (including but not limited to fuel, oil, cement, bitumen etc.) must be above any 100-year flood line or outside the designated watercourse buffer, whichever is greater. Re-fuelling must take place on a sealed surface area away from wetlands to prevent ingress of hydrocarbons into topsoil. All spills should be immediately cleaned up and treated accordingly. Should contaminated water due to spillages or other unforeseen circumstances enter identified wetland or watercourse, a wetland/aquatic specialist must be consulted	Low	Manage

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
				regarding implementation of suitable mitigation and/or rehabilitation measures. Appropriate sanitary facilities must be provided for the duration of the construction activities and all waste must be removed to an appropriate waste facility. Under no circumstances may ablutions occur outside of the provided facilities.		
Road construction	Increased surface water runoff	Increased surface water runoff into wetland and aquatic habitat.	Medium	Replaced soils should be appropriately shaped and profiled to the natural landscape profile and should be free draining. Steep slopes should be avoided to prevent erosion. As much vegetation growth as possible should be promoted during the construction phase. In order to protect soils, vegetation clearance should be kept to a minimum. All areas where active erosion is observed should be ripped, re-profiled and seeded with indigenous grasses endemic to the region.	Low	Manage
Removal of vegetation	Invasive alien plant species encroachment.	Invasive alien plant species encroachment.	Medium	An alien vegetation management plan to be implemented and managed for the duration of construction activities. The alien vegetation management plan should remain in place and form part of a maintenance plan.	Low	Control
Road construction	Buffer zone impacts.	Buffer zone impacts.	Low	No activities are to be located within the final designated buffer zone areas. Indigenous vegetation cover within the designated buffer zones is to be maintained at a minimum of 80% to ensure that the buffer remains functional.	Low	Manage
Terrestrial Biodiversity						
Road construction	Influence on terrestrial biodiversity	Removal of vegetation and basal layer. Increased proliferation of AIPs. Increased faunal casualties. Increased dust pollution.	Medium	Keep site clearing to a minimum. If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place at regular intervals or after high rainfall events. Staff of the contracting engineer must adhere to policies and plans, such as adhering to designated speed limits. Restoration and rehabilitation of removed vegetation and SCC post construction. Construction must be kept within the infrastructure footprint area, to reduce as much fragmentation as possible.	Low	Manage

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
				AIPs should be continuously monitored and controlled throughout the construction phase.		
Heavy machinery and vehicle movement	Influence on terrestrial biodiversity	Heavy machinery utilised increasing vehicle movement in the area, increasing soil compaction, habitat disturbances and vegetation removal. Natural vegetation will be removed for the road construction promoting edge effects and AIP proliferation. Increased dust pollution and erosion.	Medium	Restoration and rehabilitation of removed vegetation and SCC during rehab phase. Construction must be kept within the infrastructure footprint area, to reduce as much fragmentation as possible. Alien invasive plants should be continuously monitored and controlled throughout the life of the mine and thereafter. Corridors (infrastructure and ecological) set aside within the mine area would mitigate fragmentation substantially, especially if this could be managed with the community over an extended period of time.	Low	Manage
OPERATION PHASE						
Soil, Land Use and Land Capability						
Hydrocarbon spillages	Soil pollution	Pollution of road through spillages	Medium	Implement pollution control measures	Medium	Manage
Heavy machinery and vehicle movement	Soil compaction	Compaction of soil due to road use	Medium	Routine road maintenance to be undertaken	Low	Manage
Maintenance	Soil erosion	Soil erosion due to increase in denuded areas	Medium	Revegetate denuded areas	Low	Control
Heritage						
Maintenance	Heritage sites impact	Encroachment on heritage sites due to maintenance activities	Medium	Maintain buffer zones around identified heritage sites.	Low	Control
Traffic						
Road operation	Traffic volumes and road safety	Increase in traffic volumes and road safety infringements	Medium	Ensure road signage and speed limits are enforced	Low	Manage
Surface Water						
Road operation	Surface water sedimentation	Sedimentation of surface water resources and wetlands due to runoff and wind erosion	Medium	Maintain road surface to minimise erosion and runoff	Low	Manage
freshwater ecosystems						
Hydrocarbon spillages	Water quality deterioration	Deterioration of water quality due to hydrocarbon spillages	Medium	Stormwater off the road surface must be discharged into vegetated swales rather than directly into adjacent wetland or water resources. Emergency response to spillages of hazardous substances along the route should also be well defined and tested regularly to ensure rapid response.	Medium	Manage
Terrestrial Biodiversity						
Road operation	Faunal displacement	Displacement of fauna and bird's doe to traffic noise	Medium	Apply road calming structures, such as speed bumps, where practically implementable, to reduce speed and potential road mortalities.	Low	Control

ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION	MITIGATION TYPE
Road operation	Faunal mortalities	Faunal mortalities of fauna and birds along road route	High	Apply road calming structures, such as speed bumps, where practically implementable, to reduce speed and potential road mortalities.	Medium	Control
Road operation	Faunal and floral composition	Changes to the fauna and flora composition and habitat structure due to changes caused in surface hydrology	Medium	Monitor to detect change and efficacy of water management structures.	Low	Manage

Table 13.2: Opportunities Associated with the Project.

PHASE	ACTIVITY	SPECIALIST STUDIES	ASPECT	POTENTIAL IMPACT	OPPORTUNITY
Construction	Road construction	Social	Living standards	Change in living standards	Ensure that local individuals are employed where possible.
Construction	Road construction	Social	Waged labour	Increase in waged labour opportunities	Skills development opportunities should be granted to community members and local job seekers, where possible. Ensure that local businesses, especially those of Historically Disadvantaged Individuals (HDI), women and of Small, Micro and Medium Enterprises (SMMEs) are allocated the maximum appropriate share of project related business opportunities.
Construction	Road construction	Social	Employment	Employment creation and decrease in unemployment	It is suggested that non-locals should only be hired when specialist skills, which are not available locally, are required and local business providing such skills cannot be created.
Construction	Road construction	Social	Local economy	Increase in local economy contribution and social development	Assist the Local Municipality (LM) with the diversification of the local economy. Emphasise the use of local service providers and SMMEs and focus on the development of Local Economic Development (LED) programmes .

14 ENVIRONMENTAL IMPACT STATEMENT

It has been noted that the D 2809 Provincial Road realignment is essential to ensure that NBC can continue mining in accordance with the approved LoM plan as well as to ensure that individuals are not negatively affected as a result. The EAP would be amiss in not noting the potential negative impact on natural resources as a result of the road realignment, however these are inevitable if the benefits of the project are to be realised. It is for this reason that monitoring of key environmental resources must be of the utmost importance throughout the construction phase.

To assist in determining which impacts must be given precedence to a prioritisation is determined by assessing the public response to the impact, the potential for the impact to have a cumulative effect, and the potential for a resource to be lost, according to the criteria in **Table 14.1** – **Table 14.3**. The prioritisation serves to assist the EAP in identifying impacts that require immediate of extensive action to mitigate or address. From a risk management perspective, the prioritisation of impacts involves the organisation of the impacts that need to be addressed.

Table 14.1: Public Response.

DESCRIPTION	RATING
Low (Issue not raised in public response)	1
Medium (Issue has received a meaningful and justifiable public response)	3
High (Issue has received an intense meaningful and justifiable public response)	5

Table 14.2: Cumulative Impact.

DESCRIPTION	RATING
Low (Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change)	1
Medium (Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change)	3
High (Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change)	5

Table 14.3: Loss of Irreplaceable Resource.

DESCRIPTION	RATING
Low (The impact is unlikely to result in irreplaceable loss of resources)	1
Medium (The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited)	3
High (The impact may result in the irreplaceable loss of resources of high value (services and/or functions)	5

No impacts were prioritised as high; however this will be re-evaluated after the public and authority comment period. For this reason, the medium priority impacts are presented in summary in **Table 14.4**.

Table 14.4: Summary of Prioritised Impacts (Medium).

PHASE	ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	PRIORITISING
Air Quality				
Construction	Removal of topsoil	Liberation of dust	Dust-fall rates exceeding the residential guideline of 600 mg/m²/day.	Medium
Construction	Heavy machinery and vehicle movement	Liberation of dust	Dust liberation as a result of vehicular and machinery use and movement.	Medium
Construction	Road construction	Liberation of dust	Dust liberation as a result of construction activities.	Medium
Construction	Removal of vegetation	Liberation of dust	Dust liberation as a result of wind.	Medium
Construction	Removal of topsoil	Liberation of dust	Dust liberation as a result of soil handling.	Medium
Soil, Land Use and Land Capability				
Construction	Removal of topsoil	Agricultural potential loss	Loss of soil with an arable agricultural potential due to the removal of soils.	Medium
Heritage				
Construction	Road construction	Graves and burial grounds impact	Impact on Graves and Burial Grounds (PP 5 & PP 31)	Medium
Construction	Road construction	Homestead and structures impact	Impact on historic homesteads and structures with the possible risk for unmarked graves (PP 6 & PP 32).	Medium
Traffic				
Construction	Road construction	Heavy traffic on adjacent road network	An increase in traffic on the adjacent road network.	Medium
Construction	Road construction	Travel time	Changes in travel time.	Medium
Construction	Road construction	Road Safety	Impact on road safety.	Medium
Operation	Road operation	Traffic volumes and road safety	Increase in traffic volumes and road safety infringements	Medium

PHASE	ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	PRIORITISING
Noise				
Construction	Road construction	Noise nuisance	Noise disturbance and noise nuisance at rural noise sensitive receptors	Medium
Operation	Road operation	Noise nuisance	Increase in noise nuisance	Medium
Social				
Construction	Road construction	Safety and security	Increase in crime	Medium
Construction	Road construction	Health impact	Impact of dust fallout on the livelihoods of the agricultural community. Health impacts such as asthma, sinusitis, allergies and other respiratory diseases attributed to dust generation.	Medium
Surface Water				
Construction	Heavy machinery and vehicle movement	Surface water pollution	Pollution of surface water due to spillages, seepages or leaks and improper waste handling, storage and disposal.	Medium
Groundwater				
Construction	Hydrocarbon, fuel or chemical handling and spillage	Infiltration to groundwater system	Handling of waste and transport of building material can cause various types of spills (domestic waste, sewage water, hydrocarbons) which can infiltrate and contaminate of the groundwater system.	Medium
Freshwater Ecosystems				
Construction	Road construction	Loss of wetland and aquatic habitat.	Loss of wetland and aquatic habitat.	Medium
Construction	Road construction	Fragmentation of watercourses.	Fragmentation of watercourses.	Medium

PHASE	ACTIVITY	ASPECT (CAUSE)	POTENTIAL IMPACT (EFFECT ON ENVIRONMENT)	PRIORITISING
Construction	Removal of vegetation	Disturbance and degradation of wetland and aquatic habitat.	Disturbance and degradation of wetland and aquatic habitat.	Medium
Construction	Removal of vegetation	Invasive alien plant species encroachment.	Invasive alien plant species encroachment.	Medium
Construction	Road construction	Buffer zone impacts.	Buffer zone impacts.	Medium
Operation	Hydrocarbon spillages	Water quality deterioration	Deterioration of water quality due to hydrocarbon spillages	Medium
Terrestrial Biodiversity				
Construction	Road construction	Influence on terrestrial biodiversity	Removal of vegetation and basal layer. Increased proliferation of AIPs. Increased faunal casualties. Increased dust pollution.	Medium
Construction	Heavy machinery and vehicle movement	Influence on terrestrial biodiversity	Heavy machinery utilised increasing vehicle movement in the area, increasing soil compaction, habitat disturbances and vegetation removal. Natural vegetation will be removed for the road construction promoting edge effects and AIP proliferation. Increased dust pollution and erosion.	Medium
Operation	Road operation	Faunal displacement	Displacement of fauna and bird's doe to traffic noise	Low
Operation	Road operation	Faunal mortalities	Faunal mortalities of fauna and birds along road route	Medium
Operation	Road operation	Faunal and floral composition	Changes to the fauna and flora composition and habitat structure due to changes caused in surface hydrology	Low

15 ASSUMPTIONS AND KNOWLEDGE GAPS

The assumptions and knowledge gaps are presented in **Table 15.1**.

Table 15.1: Assumptions and Knowledge Gaps.

SPECIALIST ASSESSMENT	ASSUMPTIONS AND KNOWLEDGE GAPS
Terrestrial Biodiversity	• Whilst every effort is made to cover as much of the site as possible, representative sampling was completed as per the nature of this type of investigation. The major limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during the different seasons to ensure a comprehensive fauna and flora species list. However, due to time and cost restraints, this is not always possible. It is therefore possible that some plant and animal species that are present on site were not recorded during the field investigations. In order to overcome this limitation, the list of species observed during the site visit is supplemented with species of conservation concern that are known to occur in the area. • In the absence of a detailed soil map (1:10 000 scale), it is difficult to (with high confidence) map the extent of the natural grassland communities as vegetation reflects the soil conditions. • In order to obtain a comprehensive understanding of the dynamics of terrestrial communities, as well as the status the status of endemic, rare or threatened species in my area, faunal assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints such long-term studies are not feasible and more often based on instantaneous sampling bouts. • SARCA and SAFAP provide distribution data and the Quarter Degree Squares (QDS) resolution. Expected species list may therefore represent an overestimation of the diversity expected as very specific habitat types may be required by a species which may be present in a QDS but not necessarily on the study site within the QDS. Conversely, many large areas in South Africa are poorly sampled for herpetofauna and expected species lists may therefore underestimate the species diversity. All possible attempts were made to refine the expected species list based on species-specific habitat requirements and a deeper understanding of the habitat types and quality of the study area which was obtained during the summer survey. • The scope of work for this biodiversity assessment did not cover wetland delineation and assessments.

SPECIALIST ASSESSMENT	ASSUMPTIONS AND KNOWLEDGE GAPS
Freshwater Ecosystems	• To obtain a comprehensive understanding of the dynamics and diversity of the wetlands/watercourses present within the study area and its immediate surrounds, studies should include investigations through the different seasons of the year, over a number of years, and extensive sampling of the area. This is particularly relevant where seasonal limitations to biodiversity assessments exist for the area of the proposed activity. Due to project time constraints inherent with Environmental Authorisation application processes, such long-term research is seldom feasible, and information contained within this report is based on a single field survey conducted during a single season as well as review of biodiversity-related studies conducted by the mine over the years. Where possible, additional information was added from available sources and previous studies conducted in the area. • Furthermore, detailed assessment of the wetlands/watercourses within and in the vicinity of the study area was not carried out as part of this assessment and historical wetland studies and delineations were reviewed, scrutinised and amended based on the observations of the site visit carried out from the 13th – 16th April 2021. It is therefore possible that some discrepancies in the delineation and data provided may occur in some places. • The freshwater assessment conducted by Ecology International (2021) for the NBC Consolidation Project with the proposed road realignment study area falling within the area assessed. This information was used to inform the assessment of risk to wetlands present within 500 m of the proposed activities.
Heritage	• Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply. • The road realignment layout and footprint as depicted in this report were provided by the client. As a result, these were the areas assessed during the fieldwork. Should any additional development footprints located outside of these study area boundaries be required, such additional areas will have to be assessed in the field by an experienced archaeologist/heritage specialist before construction.

16 SPECIALIST RECOMMENDATIONS

Specific recommendations of the specialists consulted are presented in **Table 16.1**.

Table 16.1: Specialist Recommendations.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS
Terrestrial Biodiversity	All identified faunal SCC identified must be located and relocated, if necessary, before the construction phase.
	All floral SCC must be identified and located in a pre-screening assessment prior to construction. Permits will be required to relocate and/or destroy the identified protected floral species within the Project area.
	Restriction of vehicle movement over sensitive areas to reduce degradation of untouched areas. Minimise unnecessary removal of the natural vegetation cover outside the development footprint.
Freshwater Ecosystems	Wetland areas outside of the opencast footprint should be fenced off and should be designated as No-Go areas for all unauthorised personnel.
	All delineated watercourses and their buffer zones of regulation should be designated as No-Go areas and be off limits to all unauthorised vehicles and personnel, with the exception of approved construction and operational areas.
	An alien vegetation management plan must be implemented and managed for the life of the proposed project.
Heritage	A full EIA level Palaeontological Impact Assessment (PIA) report is recommended to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.
	Although the proposed construction of the road realignment is not expected to have any impact on sites PP 5, PP 30 and PP 32, to absolutely ensure the in situ preservation of these sites, monitoring of the sites by a specialist archaeologist must be undertaken during the construction of the road realignment.

17 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD BE AUTHORISED

Based on the information presented in this report, together with the consideration of all previous and current specialist reports, the reasoned opinion of the EAP is that the activities proposed and applied for should be authorised. Considering that the activities proposed have been selected to ensure that existing road users and landowners along the D 2809 Provincial Road continue to have access to the area, support this opinion.

18 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The EA will be required for the duration of the activities applied for, as per Regulation 26(d)(ii) of the EIA Regulations, 2014, as amended. The IEA is therefore requested for a period of two (2) years (i.e. conclusion date for activities in terms of Regulation 26(d)(ii)).

19 SUBMISSION AND CONSIDERATION OF DOCUMENTATION FROM THE COMPETENT AUTHORITY

Not applicable as no communication from MDARDLEA has been received.

20 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

The EAP herewith confirms-

a) the correctness of the information provided in the reports; ☑
b) the inclusion of comments and inputs from stakeholders and I&APs; ☑
c) the inclusion of inputs and recommendations from the specialist reports where relevant; and ☑
d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed. ☑

_____ 29 July 2021

Renee Janse van Rensburg Date

Environmental Compliance and Assessment Manager

Commodity Inspections Group (Pty) Ltd

21 REFERENCES

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Appendix A: Environmental Management Programme Report

Appendix B: Maps and Plans

Appendix C: Stakeholder Engagement Process Report

Appendix D: Qualifications, Curriculum Vitae and Professional Registrations of the EAP

Appendix E: Specialist Assessments