REPORT

Modikwa Platinum Mine-Aquatic Biodiversity Compliance Statement

Anglo American

Submitted to:

Mpho Mokone
Modikwa Platinum Mine
Steelpoort Region, Onverwacht 293 KT Farm
Portion 0 (Remaining Extent)

Submitted by:

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DETAILS OF THE SPECIALIST

Table 1: Details of specialist

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Curriculum vitae:	See APPENDIX C

Declaration of Independence by Specialist

I, Lufuno Nemakhavhani, declare that I –

- Act as the independent specialist for the undertaking of a specialist section for the proposed project.
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
- Do not have nor will have a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan, or document.

Lufuno Nemakhavhani

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1.0 INTRODUCTION

Modikwa Platinum Mine, a joint venture of Anglo American Platinum and African Rainbow Minerals, appointed Golder Associates Africa (Pty) Ltd. (now WSP) to undertake an aquatic biodiversity assessment of potential watercourses located within 500 m of two proposed access roads (the study area), referred to as North Shaft access road and South Shaft access road, to inform a Basic Assessment (BA) process in terms of the National Environmental Act (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) regulations of 2014, as amended for an Environmental Authorisation. In addition, the assessment will also support an application for a General Authorisation under GNR 509 of the National Water Act (Act 36 of 1998) (NWA).

1.1 Purpose of the report

This report describes the outcomes of the site sensitivity verification of the potential environmental sensitivity of the site under consideration for proposed development (as described in Section 2.0) and describes the baseline status of aquatic biodiversity of the study area as well as provide an impact assessment in accordance with the gazetted requirements for an Aquatic Biodiversity Compliance statement. This report will be submitted together as part of the application for Environmental Authorisation, in accordance with the requirements of the Environmental Impact Assessment Regulations of 2014, as amended.

2.0 PROPOSED DEVELOPMENT

The proposed development entails the construction of two access roads to the north and south ventilation shafts. The proposed access roads will be approximately 6 m in width (3 m either side of the center line), untarred, and will connect existing untarred roads to the ventilation shafts.

- The North Shaft Access road will be approximately 308 m in length, requiring an area of approximately 2,464 m^2 to be cleared. This road will branch from an existing untarred community road within close proximity to a watercourse.
- The South Shaft (Merensky) Access road will be approximately 198 m in length, requiring an area of approximately 1,586 m^2 to be cleared.

3.0 STUDY METHODOLOGY

The aquatic biodiversity compliance statement took cognisance of Government Notice No. 1150, published in Government Gazette 43110 (20 March 2020) under the National Environmental Management Act (1998) concerning the 'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity'.

In line with the assessment and reporting requirements set out in the protocol, and subsequent to the site sensitivity verification process, this aquatic biodiversity compliance assessment was prepared according to the minimum reporting requirements set out in the protocol.

3.1 Study area

Modikwa is located approximately 18.4 km north of Steelpoort and 20.5 km north-west of Burgersfort, in Limpopo Province, South Africa (Figure 1). The study area for the assessment was defined as the area of development, i.e., the proposed access road footprint, as well as any watercourses situated within a 500 m buffer of that development, i.e. the 'regulated zone' of a watercourse as defined by the National Water Act, and is depicted on Figure 2 and Figure 3.

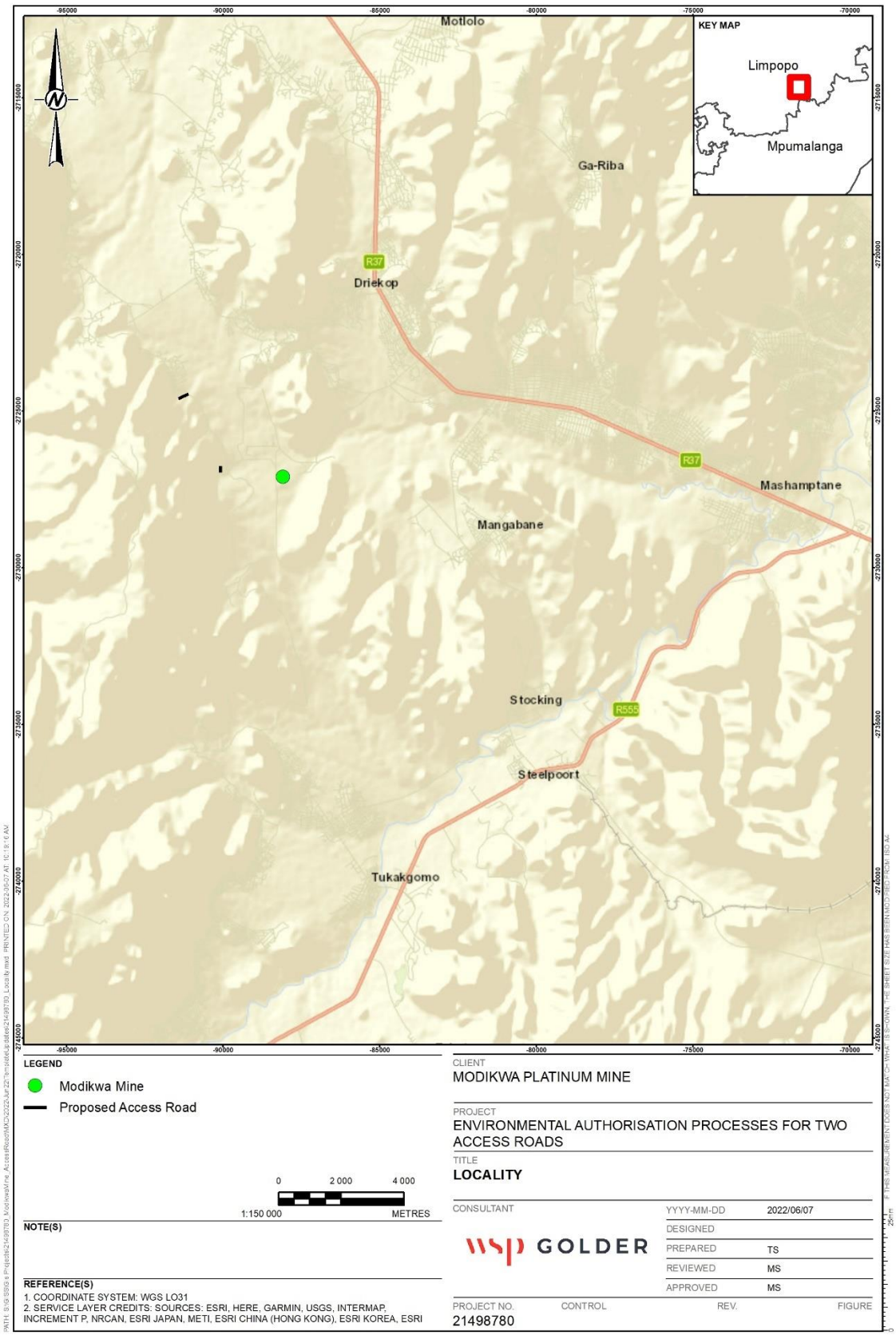

Figure 1: Modikwa Platinum Mine Study Area

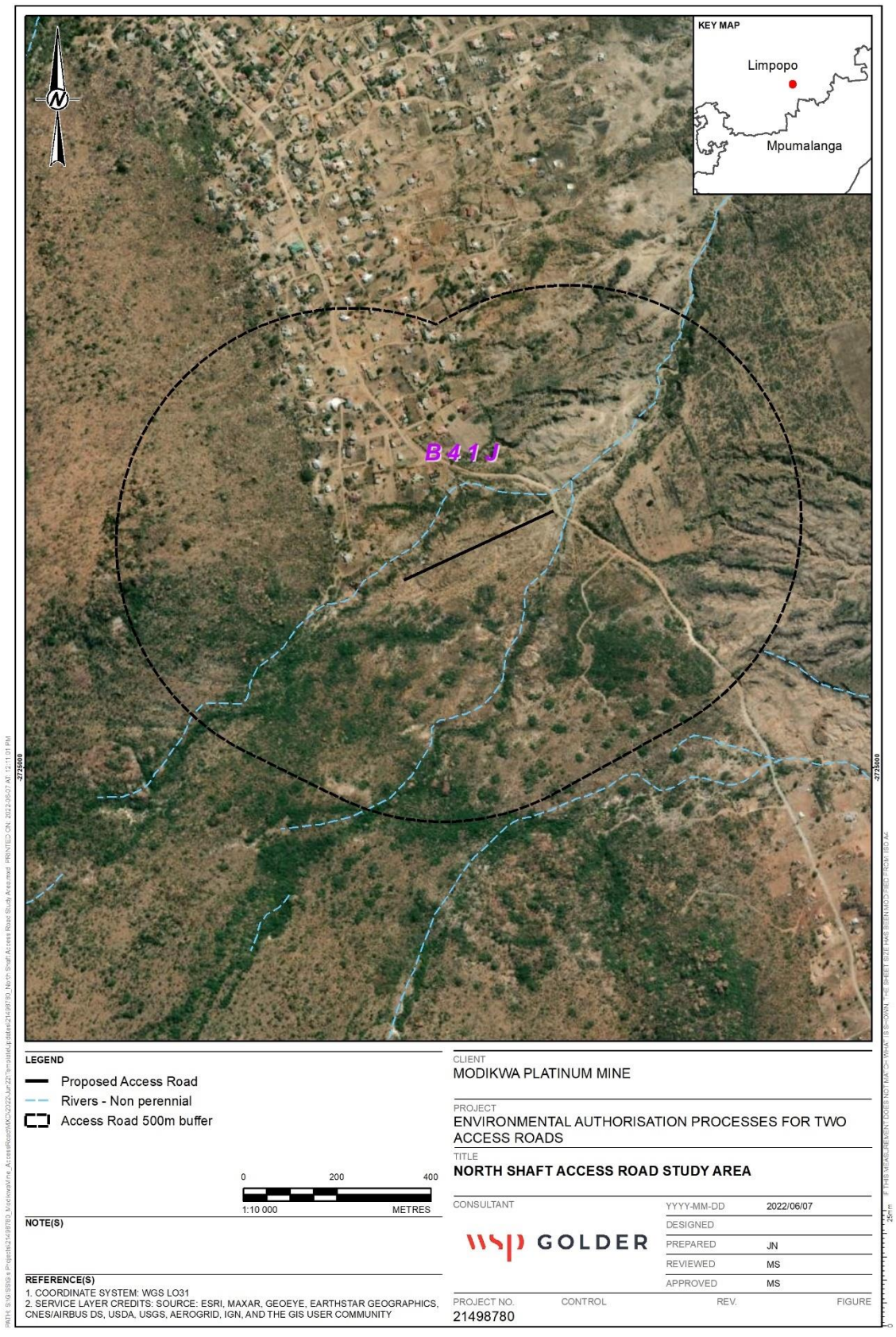

Figure 2: North Shaft Access Road Study Area

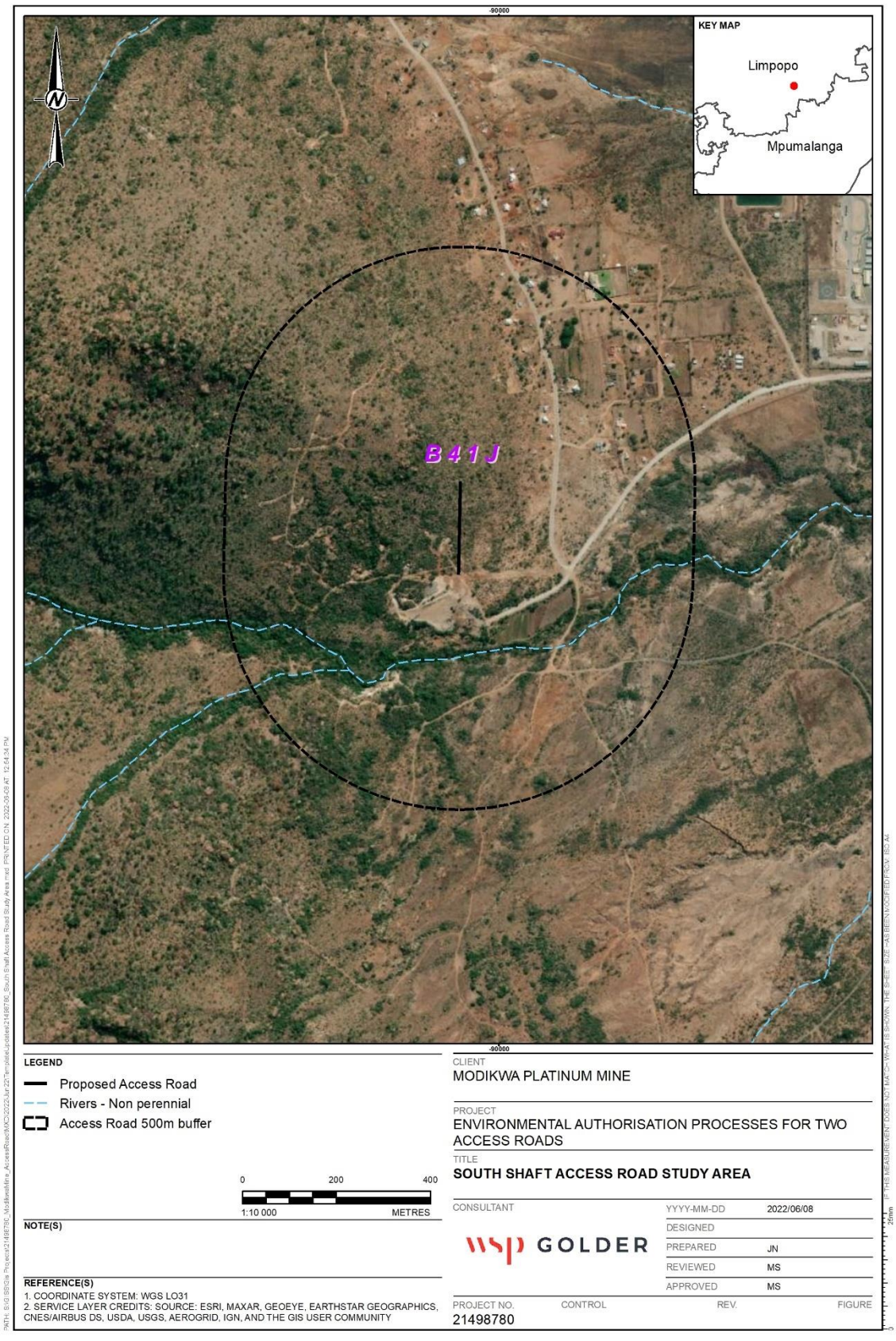

Figure 3: South Shaft Access Road Study Area

3.2 Site Sensitivity verification

The proposed Project site was assessed using the National Web-based Environmental Screening Tool. The output generated indicated that both the north and south shaft access road sites are located within a Low sensitivity area in terms of the Aquatic Biodiversity Theme (Figure 4). As a result, an aquatic biodiversity compliance statement was prepared (instead of an aquatic biodiversity specialist report) for this study.

Figure 4: Map of relative aquatic biodiversity theme sensitivity for Modikwa Platinum Mine

3.3 Field Assessment

A field survey of the study area was undertaken by a wetland ecologist on 17 and 18 March 2022, during which potential watercourses located within 500 m of the proposed development area were assessed to establish their extent and condition, and as necessary, define the correct wetland classification, and gather sufficient data to inform assessment of the Present Ecological Status (PES) and Ecological Importance and Sensitivity (EIS).

3.4 Risk Assessment

The risk assessment that has been prepared in support of the General Authorisation (GA) water use application is attached in APPENDIX B.

3.5 Impact Assessment Methodology

Impacts were identified for the construction and operational phases. For impacts identified, the standard national approach to the assessment of the significance of the identified impacts was conducted (Section 6.0).

3.5.1 Impact Assessment Methodology (for new/changed impacts)

The significance of identified impacts will be determined using the approach outlined below (terminology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998). This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further subdivided as follows (Table 2):

Table 2: Impact Assessment Factors

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude of impact

The four ranking scales used to assess the factors for each impact are outlined in **Table 3.**

Table 3: Impact assessment scoring scales

Magnitude	Duration
10- Very high/unknown	5- Permanent (>7 years)
8- High	4- Long-term (6-7 years, impact ceases after site closure has been obtained)
6- Moderate	3- Medium-term (3 months-7 years, impact ceases after the operational life of the activity)
4- Low	2- Short-term (0 - 3 months, impact ceases after the construction phase)
2- Minor	1- Immediate
Scale	**Probability**
5- International	5- Definite/Unknown
4- National	4- Highly Probable
3- Regional	3- Medium Probability
2- Local	2- Low Probability
1- Site Only	1- Improbable
0- None	0- None

The following definitions are applicable to the ranking scales outlined above:

- **Magnitude**: is a measure of the degree of change in a measurement or analysis (e.g., the area of pasture or the concentration of a metal in water compared to the water quality guideline value for the metal), and is classified as none/negligible, low, moderate or high. The categorisation of the impact magnitude may be based on a set of criteria (e.g. health risk levels, ecological concepts and professional judgement) pertinent to each of the discipline areas and key questions analysed. The various levels of magnitude, as applicable to this study, are summarised in Table 4. Appropriate, widely recognised standards are to be used as a measure of the level of impact;
- **Scale/Geographic extent:** refers to the area that could be affected by the impact and is classified as site, local, regional, national, or international;

- International- activity expected to have an impact beyond the South African boundary;
- National- activity expected to have a nationwide impact (South Africa);
- Regional- activity expected to have impact on the B41J quaternary catchment;
- Local- activity expected to have an impact on a local extent (within the Modikwa Mining Right footprint)
- Site- predicted impacts will be restricted to proposed North and South Shaft Access Road footprint.

- **Duration**: refers to the length of time over which an environmental impact may occur i.e. immediate/transient, short-term (0 to 3 months), medium-term (3 months to 7 years), long-term (greater than 7 years with impact ceasing after closure of the project), or permanent; and
- **Probability of occurrence:** is a description of the probability of the impact actually occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definitely occur).

Table 4: Magnitude definition for biodiversity assessment

Magnitude	Biodiversity Context
Minor	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation
Low	Minor shift away from existing baseline conditions. Change arising from the loss/disturbance will be discernible, but underlying character, composition and/or attributes of the baseline condition will be similar to pre-development circumstances or patterns. Having a minor effect on the known population/range of a species of concern, or extent of a natural habitat or an ecosystem of concern.
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed. Loss of a moderate proportion of the known population/range of a species of concern, or extent of an ecosystem of concern
High	Major alteration to key elements/ features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed. Loss of a high proportion of the known population/range of a species of concern, or extent of an ecosystem of concern
Very High / Unknown	Total loss of key elements/ features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed. Total loss of the known population/range of a species of concern, or extent of an ecosystem of concern

Once these factors are ranked for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

Significance Points= (Magnitude + Duration + Scale) x Probability.

The maximum value is 100 significance points (SP). The impact significance will then be rated as follows:

Points	Significance	Description
SP>60	High environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 - 60	Moderate environmental significance	An impact or benefit which is sufficiently important to require management, and which could have an influence on the decision unless it is mitigated.
SP<30	Low environmental significance	Impacts with little real effect and which will not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences/effects.

3.6 Study Assumptions and Limitations

3.6.1 Data used for Specialist Assessments

- The Aquatic Biodiversity Species Compliance statement was prepared on the basis of the site sensitivity verification process that was undertaken in response to the low aquatic sensitivity classification of the study area by the national web-based screening report. The site sensitivity verification was completed via desktop analysis of available national datasets, supplemented by the findings of the field assessment.
- The survey was conducted during March 2022 during which observations of the relevant ecosystems during a 'high flow' period, and existing pressures/driver of change, were made. These survey periods coincide with the wet season and as such maximise the opportunity for accurate description of the ephemeral aquatic ecosystem in this otherwise dry and arid region.
- It is therefore considered that there are no sampling or information limitations pertaining to this Aquatic Biodiversity Species Compliance Statement and the recommendations contained in this report.

3.6.2 Assumptions, uncertainties, or gaps in knowledge

- The aquatic biodiversity baseline description is qualitative and based on the available desktop information and findings of the March 2022 site visit. The recommended mitigation/management measures focus on the mitigation of potential impacts on aquatic ecosystem/species receptors that occur within 500 m of the proposed project infrastructure i.e., the ephemeral drainage lines within the within the study area.

4.0 AQUATIC BIODIVERSITY BASELINE DESCRIPTION

4.1 Regional Context

The study area falls within the quaternary catchment B41J of the Olifants Water Management Area (WMA) and Steelpoort sub-WMA (Figure 5). The North shaft access road is located within the Moopetsi River catchment, while the South shaft access road is within the Tubatsane River catchment, both tributaries to the Steelpoort River, a major tributary to the Olifants River system.

The South African National Wetland Map version 5 (NWM5) portrays the most up-to-date spatial data for the extent and types of estuarine and inland aquatic (freshwater) ecosystems of South Africa (Van Deventer *et al.*, 2019). The NWM5 database did not indicate the presence of wetlands within the study area (Figure 5).

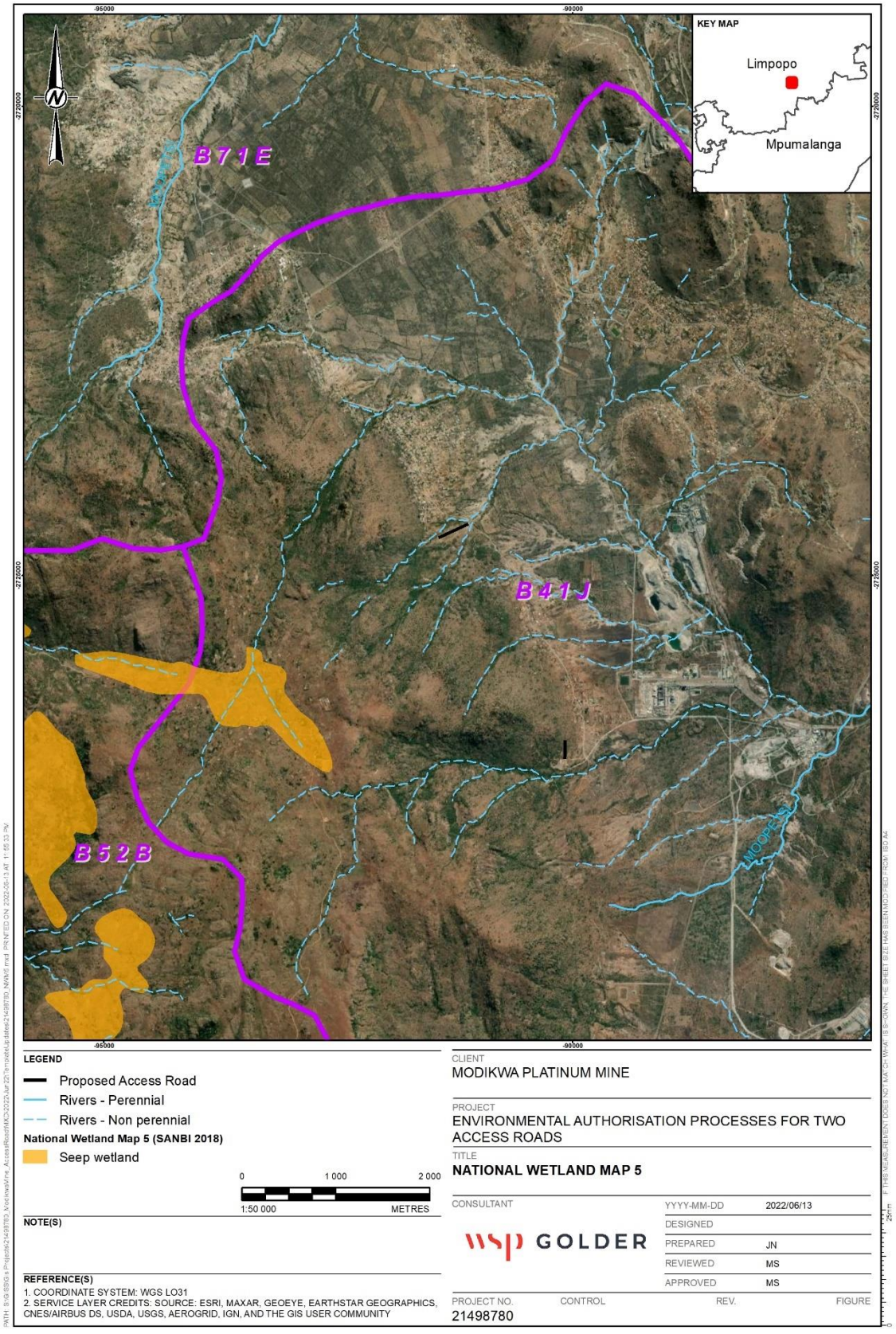

Figure 5: Wetlands identified by the National Wetland Map 5

4.2 Field Survey Findings

The study area is characterised by ephemeral drainage lines associated with unnamed, non-perennial streams. No evidence of sufficient wetland indicators to support a wetland classification, or seasonal/perennial aquatic habitat conditions, were observed within the ephemeral drainage lines during the field survey.

The proposed North shaft access road runs parallel an ephemeral drainage line associated with the non-perennial stream in the north. The area surrounding the proposed North Shaft access road is characterized by a highly eroded and undulating land surface, and sandy soils. The drainage lines in the study area are dominated by areas of erosion gullies and broad areas of sheet erosion. The soils in the study area are sandy soils with no signs of hydromorphic indicators and no hydrophilic vegetation present (Figure 6). It is probable that these drainage lines convey flows briefly during high rainfall events but do not hold water long enough to sustain wetland vegetation or aquatic biota.

A densely vegetated ephemeral drainage line with exposed bedrock substrate that feeds into a non-perennial stream occurs in the vicinity of (250 m south-east) the south shaft access road (Figure 7). Although some wetland/riparian grasses (i.e., *Sporobolus africanus* and *Hyperrenia sp*.) were present in the crevices of the rocks, the rocky substrate and steep profile indicated temporary conveyance of high flows rather than wetland conditions; therefore, this system was identified as an ephemeral drainage line.

Figure 6: Ephemeral drainage line at the North Shaft Access road

Figure 7: Ephemeral drainage line at the South Shaft access road

5.0 MOTIVATION FOR SUBMISSION OF A COMPLIANCE STATEMENT

The watercourses that are situated within the study area are ephemeral and do not support surface water flows or a soil saturation hydroperiod that is long enough to sustain aquatic biodiversity, or wetland conditions. As such, the systems are not considered to support wetland or riparian habitat and are best described as highly ephemeral drainage area.

6.0 IMPACT ASSESSMENT

Although, the compliance statement indicated that the site sensitivity is low in terms of the aquatic environmental theme, an impact assessment was prepared in support of the Basic Assessment Report (BAR). The impacts assessment was conducted for the ephemeral drainage lines that are likely to be impacted by the construction and operation of the North and South Shaft Access roads.

The majority of the impacts assessed were of Low impact significance with the exception of impacts associated with removal and levelling of topsoil in access road footprint as well as placement and compaction of fill material which will result in the increase of surface water runoff and soil erosion impacts (Table 5). These impacts can be reduced to a low impact significance provided that recommended mitigation measures as provided in section 7.0 are implemented.

Table 5: Aquatic Biodiversity Impact summary

ACTIVITY	POTENTIAL IMPACT	PHASE In which impact is anticipated	Magnitude	Duration	Scale	Probability	Significance	Significance without Mitigation	Magnitude	Duration	Scale	Probability	Significance	Significance with Mitigation
Clearing and disturbance of vegetation along road access footprint	Loss and disturbance of indigenous vegetation	Construction	4	4	1	3	27	Low	2	2	1	2	10	Low
Removal and levelling of topsoil in access road footprint	Direct loss of soils in footprint. Compaction of soils and increased surface water runoff during periods of high rainfall, leading to erosion of remnant soils in the watercourse catchment.	Construction	6	4	1	3	33	Moderate	4	2	1	2	14	Low
	Interruption/interference of hydrology (i.e. changes of surface water flows from catchment)	Construction	4	3	2	2	18	Low	2	2	1	2	10	Low
Set up of temporary construction laydown area	Loss and disturbance of indigenous vegetation, soil compaction	Construction	4	2	1	2	14	Low	2	1	1	2	8	Low
Transportation of construction material	Contamination of soil and downstream resources due to hydrocarbons and	Construction	4	2	2	3	24	Low	2	1	1	2	8	Low

ACTIVITY	POTENTIAL IMPACT	PHASE In which impact is anticipated	Magnitude	Duration	Scale	Probability	Significance	Significance without Mitigation	Magnitude	Duration	Scale	Probability	Significance	Significance with Mitigation
	oil spillages from vehicle during site preparation													
	Establishment and spread of Alien Invasive Species	Construction	4	2	2	2	16	Low	2	1	1	2	8	Low
Placement and compaction of fill material	Soil compaction, surface water runoff leading to increased soil erosion	Construction	6	4	2	3	36	Moderate	4	2	1	2	14	Low
Replacement of topsoil and rehabilitation of disturbed areas within the watercourse	Sediment displacement	Construction	4	3	2	3	27	Low	2	2	1	2	10	Low
	Contamination due to hydrocarbons and oil spillages from vehicle during rehabilitation	Construction	4	2	1	3	21	Low	2	1	1	2	8	Low
Operational Phase														
Presence and maintenance of access road located within a 500 m buffer of a watercourse	Contamination due to hydrocarbons and oil spillages from vehicle during operation, soil erosion, and the spread of alien invasive species within the watercourse	Operation	4	4	2	2	20	Low	2	2	1	2	10	Low
	Interruption/interference of hydrology as a result of	Operation	4	3	2	3	27	Low	4	1	1	2	12	Low

ACTIVITY	POTENTIAL IMPACT	PHASE In which impact is anticipated	Magnitude	Duration	Scale	Probability	Significance	Significance without Mitigation	Magnitude	Duration	Scale	Probability	Significance	Significance with Mitigation
	blockage of culverts with debris													
Grading of access roads	Soil compaction, surface water runoff leading to increased soil erosion in catchment of watercourse	Operation	4	3	2	3	27	Low	4	1	1	2	12	Low

7.0 PROPOSED IMPACT MANAGEMENT ACTIONS

Due to the low sensitivity of the study area and the degraded surrounding landscape, the proposed development of two access tracks is not expected to have significant impacts on aquatic biodiversity. The following impact mitigation and management measures are recommended to avoid/minimise potential impacts on the watercourse arising from the proposed North and South shaft access road:

- During construction, vegetation cleared should be limited to the direct project footprint, i.e., proposed road footprint. Where possible, available roads should be used to access the site and no vehicles should be permitted to indiscriminately drive over watercourses.
- Similarly, topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil and must be stored in a manner that it can be reused after construction. Any excavated soils should be offloaded at designated stockpile area situated well away from the watercourse.
- Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.
- Existing roads/tracks should be utilized for access to the construction area where possible, and clearly defined access routes should be set out for contractors.
- Construction activities should ideally be undertaken during the dry season (May to September), and completed as soon as possible – e.g. within 4-6 weeks.
- Limit the use of machinery within watercourses during road construction activities.
- Make use of existing mine facilities for the purpose of laydown areas and ablutions. If necessary, locate ablutions and laydown areas outside the regulated 500 m buffer of a watercourse
- No maintenance of vehicles shall be undertaken within 500 m of the watercourse. The construction vehicles must be inspected for possible oil leaks prior to site access. The use of a drip tray under all stationary vehicles is mandatory within the regulated area.
- The existing culvert crossings located on the community access road must be inspected regularly throughout the operational period. Inspections should be conducted during/immediately after periods of high rainfall to ensure that structural integrity is maintained, and any blockages cleared out timeously.

8.0 MONITORING REQUIREMENTS

The following monitoring requirements are proposed:

- The implementation of the recommended mitigation measures should be monitored on an at least annual basis, to audit their efficacy in addressing potential impacts, so that adaptive management actions can be timeously undertaken as necessary, to ensure that potential impacts on the receiving environment are avoided/minimised.

9.0 CONCLUSION

The proposed study area is located in an area classified as having a low aquatic biodiversity sensitivity according to the National Web-based Environmental Screening. In addition, the NWM5 did not identify any wetlands within a 500 m buffer of the proposed development sites. Three ephemeral drainage lines associated with non-perennial streams - two in the north shaft access road site and one in the south access road sites - were identified on site. The proposed project is expected to have low impact significance for the majority of the impacts identified, with the exception of surface runoff and soil erosion impacts due to the fact that the proposed

study area is highly eroded. These impacts can however be reduced to a low impact significant given that the recommended mitigation measures are strictly implemented during both the construction and operation phase of the access roads.

10.0 REFERENCES

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APPENDIX A

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GOLDER ASSOCIATES AFRICA (PTY) LTD

APPENDIX B

GA Risk Assessment

Construction of Modikwa Mine Road Access
Risk Assessment for section 21(c) and (i) water use in terms of GA40229, GN 509 of 2016

Risk number	Phase	Activity	Aspect	Impact	Flow Regime	Physico & Chemical	Habitat	Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal issues	Detection	Likelihood	Significance	Risk Rating	Confidence level	Control measures	Borderline LOW MODERATE rating classes	PES, EIS and REC of watercourse
		Site establishment and construction within a watercourse																					
1	**Construction**	**Site establishment**	Clearing and disturbance of vegetation along road access footprint	Loss and disturbance of indigenous vegetation	1	1	2	1	**1,25**	1	1	**3,25**	1	2	5	1	**9**	29,3	LOW		Clearing of vegetation must be limited to direct road footprint.Make use of existing roads to access the site as far as possible, no vehicles is permitted to drive in through the non-perennial river (watercourse).	The proposed access road will have a low risj rating on available watercourses. Nonetheless, recommended mitigation measures must be adhered at all times. The prosed project impacts will be minor, localised to the immediate intervention site and of short duration. All impacts can be mitigated as per the control measures proposed.	The PES and REC of the watercourse is not dertemined, however the proposed access road will not negatively affect the current status of the watercourse
2			Removal and levelling of topsoil in access road footprint	Direct loss of soils in footprint. Compaction of soils and increased surface water runoff during periods of high rainfall, leading to erosion of remnant soils in the watercourse catchment.	2	1	2	1	**1,50**	1	1	**3,50**	1	2	5	2	**10**	35,0	LOW		Topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil, and must be stored in a manner that it can be reused after construction. Any excavated soils should be offloaded at designated stockpile area outside 500m of watercourse. Revegetate exposed soils along the road servitude after construction. Existing roads/tracks should be utilized for access to the construction area where possible, and clearly defined access routes should be set out for contractors.		
				Interruption/interference of hydrology (i.e. changes of surface water flows from catchment)	3	3	3	3	**3,00**	1	2	**6,00**	1	2	5	1	**9**	54,0	LOW		Construction activities must be undertaken during the dry season (May to September) as far as possible. Where possible, construction activities must be completed within one month. Limit the use of machinery movement within watercourses during road construction activities.		
3			Set up of temporary construction laydown area	Loss and disturbance of indigenous vegetation, soil compaction	1	1	2	1	**1,25**	1	1	**3,25**	1	1	5	1	**8**	26,0	LOW		Make use of existing mine facilities for the purpose of laydown areas and ablutions where possible. Where necessary, locate ablutions and laydown areas outside the regulated 500m of a watercourse		
5		**Transportation of construction material**	Spillage of oil or hydrocarbon contaminants	Contamination due to hydrocarbons and and oil spillages from vehicle during site preparation	2	1	2	2	**1,75**	1	2	**4,75**	1	1	5	1	**8**	38,0	LOW		No maintenance of vehicles within 500m of regulated wetland boundary The construction vehicles must be inspected for possible oil leaks prior site access, during construction and when leaving site. The use of a drip tray under all stationary vehicles is mandatory within the regulated area.		
			Movement of construction vehicles	Establishment and spread of Alien Invasive Species	2	1	2	2	**1,75**	1	2	**4,75**	1	1	5	1	**8**	38,0	LOW		Construction activities must be undertaken during the dry season (May to September) as far as possible. Control existing stands of AIS vegetation in the road construction footprint and along access routes prior to construction commencement. Limit the movement of vehicles in the construction footprint to limit the spread of alien invasive species.		
6		**Placement and compaction of fill material**	Grading of at access road	Soil compaction, surface water runoff leading to increased soil erosion	2	1	2	2	**1,75**	1	2	**4,75**	1	1	5	1	**8**	38,0	LOW		Make use of light grading machinery while working in the watercourse to limit compaction and soil erosion. Limit the use of equipment to one motor grader at a time. Grading activities must be undertaken during the dry season		
7		**Replacement of topsoil and rehabilitation of disturbed areas within the watercourse**	Replacement of topsoil	Disturbance of wetland vegetation and sediment displacement	2	3	3	3	**2,75**	1	2	**5,75**	1	2	5	1	**9**	51,8	LOW		Construction activities must be undertaken during the dry season (May to September) as far as possible. Topsoil replacement and revegetation must be limited to the affected footprint as possible. Excavated soils will need to be replaced in the same order as removed, i.e. sub-soil must be replaced first and topsoil must be replaced last. This will maximize opportunity for swift re-vegetation of disturbed areas		
8			Spillage of oil or hydrocarbon contaminants	Contamination due to hydrocarbons and and oil spillages from vehicle during rehabilitation	3	4	3	3	**3,25**	1	2	**6,25**	1	1	5	1	**8**	50,0	LOW		No maintenance of vehicles within 500m of regulated wetland boundary. The vehicles must be inspected for possible oil leak prior site access, during rehabilitation and when leaving site. The use of drip tray under all stationery vehicles is mandatory within regulated area; however it is recommended that no vehicles are parked overnight at the construction area, and are rather moved to secure mine facilities for longer term storage.		
		Operational Phase																					
9	**Operation**	**Presence and maintenance of access road located within a 500 m buffer of a watercourse**	Road crossing at watercourse	Contamination due to hydrocarbons and and oil spillages from vehicle during operation, Soil erosion, the spread of alien invasive species within the watercourse	2	1	2	1	**1,50**	1	3	**5,50**	1	1	5	1	**8**	44,0	LOW		Existing culvert crossing (located on the community road)must be inspected regularly and maintained as required, Mine vehicles must be inspected for possible oil leaks regularly.		
			Blockage of culverts (existing) with debris	Interruption/interference of hydrology	3	2	3	3	**2,75**	1	2	**5,75**	1	2	1	1	**5**	28,8	LOW		Inspect culverts after periods of high rainfall and remove any accumulated debris to ensure flow is not affected.		
			Grading of access road	Soil compaction, surface water runoff leading to increased soil erosion in catchment of watercourse	2	1	2	2	**1,75**	1	2	**4,75**	1	1	5	1	**8**	38,0	LOW		Make use of light grading machinery while working in the watercourse to limit compaction and soil erosion. Limit the use of equipment to one motor grader at a time. Grading activities must be undertaken during the dry season		
	Decommissioning Phase	**Decommissioning Phase**																					
		Will be addressed at decommisioning phase																					

Completion of Risk Matirx overseen by:

_____
Lufuno Nemakhavhani
SACNASP registration number:
Date: 30/03/2022

APPENDIX C

Specialist CV

Education

Master of Environmental Management Environmental Management, University of the Free State, Free State, 2020

Bsc (Hons) Environmental management Environmental Management, University of South Africa, Johannesburg, 2016

Bsc life and environmental science Geography and environmental, University of Johannesburg, Johannesburg, 2012

Languages

Tshivenda – Fluent

English – Fluent

Zulu – Fluent

Johannesburg

Junior Wetland Ecologist

Lufuno is a junior wetland ecologist with seven years' experience in the consulting firm. Her experience includes environmental permitting, environmental compliance auditing and biodiversity assessments which includes wetland assessment, terrestrial assessment, and aquatic biomonitoring assessment. Her core interest lies in biodiversity assessment, particularly, wetland ecological assessments.

Her responsibilities within the biodiversity division at Golder includes wetland monitoring, wetland delineation and wetland health assessments, wetland impact assessment, terrestrial assessments, and biodiversity management assessments. She has successfully completed biodiversity assessment project both locally and internationally (Africa).

Employment History

WSP Group Africa (Pty) Ltd. – Midrand
Wetland Ecologist (2017 to Present)

Conducting Environmental Impact Assessments
Compiling Environmental Management Plans
Involvement in international Environmental and Social Impact Assessment in the Oil and Gas industry
Conducting external Environmental Compliance Auditing
Undertaking Mining Right Applications and Section 102 applications
Conducting Wetland Assessment and Delineations
Conducting Aquatic Biomonitoring Assessments
Involvement in Ecological Assessments
Involvement in Mine Closure and Rehabilitation Plan
Conducting surface water and Groundwater monitoring

Sazi Environmental Consulting – Midrand
Environmental Consultant (2015 to 2017)

Water use License Application
Environmental Practice facilitation
Wetland Assessment and Delineation
Business development
Ecological Assessments and species identification
Integrated Water and Waste Management Plans
Environmental Impact Assessment (Basic Assessment)
ARC GIS Mapping (locality maps, sensitivity areas and delineation maps) Public participation Process
Environmental Compliance and Enforcement Audits
Implementing the Environmental management plan

Sebata Group of Companies – Midrand
Environmental sciences intern (2013 to 2014)

Involvement in undertaking Environmental Impact Assessments (EIAs);
Report/chapter writing;
Preparation of project proposals, cost outline, resource allocation and timeline.
Site visit and attendance/participation at meetings;
Conducting Public Participation Process;
Involvement in Eskom Projects such as Ingula Pump Storage Scheme;
Assisting in ISO 14001 internal auditing.

PROJECT EXPERIENCE – ECOLOGY

Metalkol Mining Concession Katanga, DRC	Compiled a Biodiversity Action Plan for Metalkol Mining Concession
Arnot Mine Mpumalanga, South Africa	Collaborated in the compilation of Arnot Mine Closure Site Biodiversity Study
Eskom Lethabo Power Station Free State, South Africa	Compiled a Biodiversity Management Plan for Eskom Lethabo Power Station consistent with the norms and standards for biodiversity management plans for indigenous and migratory species in accordance with Eskom Biodiversity standards
Kamoa Copper Katanga, DRC	Compiled a Biodiversity Impact Assessment for Kamoa Copper Powerline ESHIA
Lakenvlei Wetland Rehabilitation Mpumalanga, South Africa	Compiling a Wetland Construction Method Statement for the rehabilitation process Monitoring rehabilitation progress
Anglo American BMP Mpumalanga, South Africa	Screening Assessment for Flora and Fauna species within seven Anglo American Mines
Genser Ghana Ghana	Phase II Biodiversity Baseline, Impact Assessment and Action Plan
Glencore iMpunzi Mpumalanga, South Africa	Ecological screening study for the proposed haul road at iMpunzi complex mine
Nooitgedacht 406KQ portion 2 and 10 Limpopo, South Africa	Conducting a wetland delineation and assessment of Portion 2 and 10 of the Nooitgedacht 406 KQ Property associated with the Nooitgedacht Mine as part of a Water Use License Application.
Mafube LifeX Project Mpumalanga, South Africa	Conducting a wetland audit of the wetland crossings within the Mafube LifeX site against the approved WUL conditions
Belfast Implementation Project Mpumalanga, South Africa	Conducting a wet season wetland assessment to monitor changes within each identified Belfast wetland HGM unit against the baseline results obtained prior to the Belfast Implementation Project.

PROJECT EXPERIENCE – ENVIRONMENTAL ASSESSMENT

Glencore iMpunzi Mpumalanga, South Africa	Conducting environmental Impact Assessment and compiling the scoping report for the integrated regulatory process associated with the proposed expansion of the iMpunzi paddocks and venture dump facilities
Bushveld Vametco North west, South Africa	Conducting Basic Impact Assessment for the Development of solar panels and a Vanadium Redox Flow Battery storage within a mining right area at Vametco Mine in Brits, North West.

Vanderbijlpark service road along Houtheuwel and Potchefstroom railway line Gauteng, South Africa	Environmental Assessment Practitioner for a basic assessment and Water Use Licence of the reconstruction of the Transnet Collapsed bridge in Vanderbijlpark service road along Houtheuwel and Potchefstroomrailway line.

PROJECT EXPERIENCE – ENVIRONMENTAL MANAGEMENT

GoodRock Chemworks Kathu, Northern cape	Conducting external Environmental compliance audit for the operational phase of a Ball Mill project
Universal Coal North Block Complex (NBC) Paardeplaats Mine Mpumalanga, South Africa	External Environmental Control Officer for NBC Paardeplaats Mine. Undertaking weekly environmental compliance audits in accordance with the approved EMP and authorised WUL at the Paardeplaats Mine.
Vopak South Africa Developments_Lesedi Gauteng, Heidelberg, South Africa	Environmental Control Officer for the VSAD Lesedi Project. Conducting environmental compliance audits for the construction phase of the VSAD Lesedi which entails the construction of hydrocarbon storage tanks.
Ariadne-Eros Eskom Powerline Kwazulu-Natal, South Africa	Environmental Control Officer for the Eskom Ariadne-Eros Powerline .Conducting environmental compliance and enforcement audits on a full-time basis during the construction of the Eskom Powerline.

TRAINING

Introduction to Wetland Delineation and Assessment
University of Free State, 2017

Standard ARC GIS mapping
ESRI, 2015

PROFESSIONAL AFFILIATIONS

South African Wetland Society

South African Council of Natural Scientist Professional

golder.com