PROPOSED MINING RIGHT OVER PORTION 0 AND PORTION 1 (REMAINING EXTENT) OF THE FARM DE KLERKS KRAAL NO 231, THEUNISSEN DISTRICT, FREE STATE PROVINCE

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

VENGABLOX

DEPARTMENTAL REFERENCE NUMBER:

FS 30/5/1/2/2/10071 MR

JULY 2022

PREPARED FOR:

Vengablox (Pty) Ltd
28 Potgieter Street
P.O. Box 202
Theunissen
9410
Contact Person: Mr M du Plessis
Tel: 057 733 1626
Cell: 083 410 8286
E-mail: machiel@wzbeton.co.za

PREPARED BY:

Greenmined Environmental (Pty) Ltd
Unit MO1, No 106 AECI Site
Baker Square, Paardevlei
De Beers Avenue
Somerset West, 7130
Contact Person: Ms C Fouché
Tel: 021 851 2673
Cell: 082 811 8514
Fax: 086 546 0579
E-mail: Christine.f@greenmined.co.za

greenmined environmental

EXECUTIVE SUMMARY

Vengablox (Pty) Ltd applied for environmental authorisation to mine sand from 238.5426 ha (hereafter rounded off to 239 ha) that extends over Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 RD within the Lejweleputswa magisterial district of the Free State Province.

Although the proposed project footprint extends over a large area, the Applicant proposes to divide the mining right footprint into smaller mining areas of ±2.5 ha each (minor area). It is proposed that no more than two (2) minor areas will be mined at any given time. In addition to the proposed 2.5 ha minor areas, the Applicant will have a designated processing- and stockpiling area (1.5 ha) where the mined material will be screened and washed prior to being stockpiled and transported to clients. One sand pump (at a time) will also be used to mine sand from the riverbed. In other words, the total footprint to be altered by mining activities at any given time calculates to ±6.5 ha of the 239-ha mining right area. Once a 2.5 ha area is mined the area will be rehabilitated prior to the opening of a third minor area.

Upon commencement, the proposed project will trigger listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and the Environmental Impact Assessment Regulations 2014 (as amended) and therefore requires an environmental impact assessment (EIA) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources and Energy) when considering the environmental authorisation.

Alternatives:

During the EIA phase the no-go alternative, site-, and various layout alternatives were assessed upon receipt of the site-specific information, comments received from the public, and the results of the specialist studies.

Site Alternative 1 entails the mining of ±239 ha from Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231, within the boundaries of the GPS coordinates listed in Table 4.

The specialists considered the initial layout and accordingly submitted their respective recommendations. Following receipt of the specialist reports, the initial layout of the project was refined. This ultimately led to the Final Layout Alternative (FLA) as proposed in this report. The FLA is deemed the preferred option as it accommodates the recommendations of all the specialists. Should the FLA be implemented the proposed activity is deemed to be of moderate significance to the receiving environment.

Public Participation Process:

The relevant stakeholders and I&AP's were informed of the mining right application by means of an advertisement in the Vista, and on-site notices that were placed at the property boundary, intersection of the access roads, as well as in Theunissen. A notification letter inviting comments on the DSR and draft Social and Labour Plan (DSLP) over a 30-days commenting period (ending 14 February 2022) was also sent to the landowners, lawful occupier, neighbouring landowners, stakeholders, and any other I&AP that may be interested in the project. The stakeholders and I&AP's were also invited to a virtual meeting (26 January 2022) where the project was to be discussed. No attendees registered for the virtual meeting.

The comments and responses received on the DSR were incorporated into the Final Scoping Report (FSR) that was submitted to the DMRE on 15 February 2022 and approved on 05 April 2022. The draft Environmental Impact Assessment Report (EIAR) was compiled and was circulated for public comments over a 30-day period that extended until 12 July 2022. The comments received on the draft EIA & EMPR were incorporated into the final EIA & EMPR to be submitted to the DMRE for decision making.

Environmental Impact Assessment Report:

The environmental impact assessment report identifies the potential positive and negative impacts that the proposed activity will have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

The key finding of the environmental impact assessment regarding the proposed project entail the following:

Topography:

- The proposed activity will impact the topography of the earmarked footprint in that the virgin soil level of the floodplain/riparian area will be reduced as simulated in Figure 5. The depth of the mining activities will be limited to ±300 mm above the groundwater table.

Visual Characteristics:

- The proposed footprint will mainly be visible from the immediate surrounding areas. From the viewshed analysis it is shown that the visual impact of the earmarked footprint will be of medium significance without mitigation. The small scale of the proposed operation, and the proposed progressive rehabilitation, will however assist in mitigating the visual impact of the proposed development on the surrounding environment. No residual visual impact is expected upon closure of the mine.

Air Quality:

- The current activities on the property and surrounding environment already impact the air quality and noise ambiance of the study area. Should the mining right be approved, it is expected that the mining operation will generate approximately the same noise levels as the current sand mining operation. Due to the small scale of the operation the noise levels and potential dust impact to be generated at the mine is deemed to be of low significance to the surrounding environment.

Geology:

- The study area is situated on geology associated with the Volksrust Formation. The Volksrust Formation of the Ecca Group in the vicinity of Theunissen is dominated by underlying mudrock. However, the site and surroundings are dominated by quite deep alluvial deposits consisting of fine sand and silt soils.

Hydrology, Geohydrology and Groundcover (including wetlands):

- The specialist determined that a buffer of 38 m from the edge of the floodplain wetland areas and the wetland conditions along the Sand River main channel and lateral stream systems must be maintained. The portions of the floodplain outside this 38-meter buffer are still regarded as having a moderate sensitivity but impacts here will be more easily manageable. As a result, mining operations, except for one sand pump and associated access, should aim to avoid all areas regarded as having a very high and high level of sensitivity, while focussing operations in areas with moderate sensitivity. The risk of the proposed activity, in accordance with the proposed mitigation measures, is anticipated to be moderate.

- No rare or endangered species were encountered in the area.

- The possible impacts associated with the project will influence the water quality and biotic integrity of the system if not mitigated, and therefore need to be monitored continuously to limit any adverse effects.

Terrestrial Fauna:

- Natural occurring faunal species are sparse because of human activities in the general areas. No resident faunal species of conservation concern were identified within the proposed mining area. The avifauna co-exist with the existing sand mine, as all bird species are highly mobile and can readily move away from disturbance. Considering the adaptability shown by the animals to changes in their environment, it is proposed that should future mining activities be confined to a maximum of two minor areas at a time (maximum of 5 ha) supported by one processing area (1.5 ha), and progressive rehabilitation, the faunal component of the area would be able to adapt to the changes. Free movement of roaming species in and out of the work areas must be allowed, and activities must be restricted to daylight hours.

Cultural and Heritage Environment:

- No heritage sites of significance occur within the impact area and no adverse impact to heritage resources are expected.

Socio-economic Environment:

- The proposed mine will create ±16 employment opportunities to locals. The Applicant intends to spend at least R 360 753.00 on Human Resource Development, and R 61 594.00 on Local Economic Development (LED) over a 5-year period. In addition to the LED project, the mine will afford the employees, with an education level lower than ABET 4, the opportunity to become functionally literate.

Existing Infrastructure:

- Apart from the mining infrastructure at the Blazecor mining area, no other infrastructure exists on the proposed mining footprint that could be affected by the proposed activity.

During the environmental impact assessment process, the feasibility of the proposed site was assessed to identify fatal flaws that are deemed as severe as to prevent the activity continuing or warrant a site or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing.

Environmental Management Programme (EMPR)

The EMPR provides a description of the impact management outcomes and closure objectives. It presents the impacts to be mitigated in their respective phases as well as stipulates the mitigation measures to be applied on site.

The financial provision amount that will be necessary for the rehabilitation of the mining area, both at sudden closure during the normal operation of the project, and at final, planned closure is a sum of R 576 997.91.

LIST OF ACRONYMS

ABET	Adult Based Education and Training
AIA	Archaeological Impact Assessment
ASPT	Average Score Per Taxon
ASTM	American Society for Testing and Materials
SR	Biodiversity Sensitivity Rating
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Areas
DEFF	Department of Environment, Forestry and Fisheries
DEIAR	Draft Environmental Impact Assessment Report
DESTEA	Department of Economic Small Business Development, Tourism and Environmental Affairs
DMRE	Department of Mineral Resources and Energy
DSLP	Draft Social and Labour Plan
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Ecological Category
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPR	Environmental Management Programme
ESAg	Earlier Stone Age
ESA	Ecological Support Area
FEIAR	Final Environmental Impact Assessment Report
FEPA	Freshwater Ecosystem Priority Area
FLA	Final Layout Alternative
FRAI	Fish Response Assessment Index
FS	Free State Province
FSBP	Free State Biodiversity Plan
FSR	Final Scoping Report
GDP	Gross Domestic Product
GNR	Government Notice Number
GVA	Gross Value Added
HAS	Hazardous Substances Act, 1973 (Act No 15 of 1973)
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party

IDP	Integrated Development Plan
IHI	Index of Habitat Integrity
LC	Least Concern
LDM	Lejweleputswa District Municipality
LED	Local Economic Development
LN	Listing Notice
LSA	Later Stone Age
MHSA	Mine Health and Safety Act, 1996 (Act No 29 of 1996)
MIRAI	Macroinvertebrate Response Assessment Index
MLM	Matjhabeng Local Municipality
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)
MR	Mining Right
MSA	Middle Stone Age
NEM:AQA	National Environmental Management: Air Quality Control Act, 2004 (Act No 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NT	Near Threatened
NRTA	National Road Traffic Act, 1996 (Act No 25 of 1996)
NWA	National Water Act, 1998 (Act No 36 of 1998)
OHSA	Occupational Health and Safety Act, 1993 (Act No 85 of 1993)
PCB's	Polychlorinated Biphenyls
PCO	Pest Control Officer
PES	Present Ecological Sensitivity
PIA	Palaeontological Impact Assessment
PPE	Personal Protection Equipment
PSM	Palaeontological Sensitivity Map
QDGC	Quarter Degree Grid Cells
RHP	River Health Programme
S1	Site Alternative 1
SAHRA	South African Heritage Resources Agency
SAMBF	South African Mining and Biodiversity Forum
SAMRAD	South African Mining Mineral Resources Administration System
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SASS5	South African Scoring System version 5
SD	Downstream Sampling Site

SLP	Social and Labour Plan
SM	Sampling Site Near Existing Sand Mine
SU	Upstream Sampling Site
SWMP	Stormwater Management Plan
TWQR	Target Water Quality Range
WMA	Water Management Area
WRA	Wetland and Riparian Assessment
WULA	Water Use Licence Application

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT:	Vengablox (Pty) Ltd
TEL NO:	057 733 1626
FAX NO:	-
POSTAL ADDRESS:	P.O. Box 202, Theunissen, 9410
PHYSICAL ADDRESS:	28 Potgieter Street, Theunissen
FILE REFERENCE NUMBER SAMRAD:	FS 30/5/1/2/2/10071 MR

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development act (Act 28 of 2002 as amended); the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorization can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation, or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulation, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has considered any minimum requirements applicable, or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorization for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as failure to meet the requirements of the Regulation and will lead to the Environmental Authorization being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the Applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process-

(a) determine the policy and legislative context within the activity is located and document how the proposed activity complies with and responds to the policy and legislative context,

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location,

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment,

(d) determine the –

(i) nature, significance, consequence, extent, duration, and probability of the impacts occurring to inform identified preferred alternatives, and

(ii) degree to which these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources, and

(cc) can be avoided, managed, or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts, and

(h) identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the Act. Vegablox (Pty) Ltd (hereafter referred to as the "Applicant") appointed Greenmined Environmental (Pty) Ltd (hereafter referred to as "Greenmined") to undertake the study needed. Greenmined has no vested interest in Vegablox (Pty) Ltd or the proposed project and declares its independence as required by the EIA Regulations, 2014 (as amended).

i) Details of the EAP

Name of the Practitioner:	Ms Christine Fouché
Tel No:	021 850 8875 / 082 811 8514
Fax No:	086 546 0579
E-mail address:	christine.f@greenmined.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP
(With evidence).

Ms Fouché has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full cirriculum vitae with evidence is attached as Appendix Q.

(2) Summary of the EAP's past experience
(In carrying out the Environmental Impact Assessment Procedure)

Ms Fouché has seventeen years' experience in doing Environmental Impact Assessments and Mining Applications in South Africa. See a list of past projects attached as Appendix Q.

b) Description of the property

Table 1: Description of the property.

Farm Name:	❖ Portion 0 of the farm De Klerks Kraal No. 231 ❖ Portion 1 (Remaining Extent) of the farm De Klerks Kraal No. 231
Application area (Ha)	238.5426 ha
Magisterial district:	Lejweleputswa
Distance and direction from nearest town	The proposed application area is located ±35 km north of Theunissen and ±25 km south of Welkom in the Free State Province.
21-digit Surveyor General Code for each farm portion	❖ F03300000000023100000 ❖ F03300000000023100001

c) Locality map

(Show nearest town, scale not smaller than 1:250000)

The requested map is attached as Appendix B.

d) Description of the scope of the proposed overall activity

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1:10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

Vengablox (Pty) Ltd applied for environmental authorisation to mine sand from 238.5426 ha (hereafter rounded off to 239 ha) that extends over Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 RD within the Lejweleputswa magisterial district of the Free State Province.

Although the proposed project footprint extends over a large area, the Applicant proposes to divide the mining right footprint (hereinafter referred to as the “major area”) into smaller mining areas of ±2.5 ha each (hereinafter referred to as the “minor areas”). It is proposed that no more than two (2) minor areas will be mined at any given time. In addition to the proposed 2.5 ha minor areas, the Applicant will have a designated processing- and stockpiling area (1.5 ha) where the mined material will be screened and washed prior to being stockpiled and transported to clients. In other words, the total footprint to be altered by mining activities at any given time calculates to ±6.5 ha of the 239-ha mining right area. Once a 2.5 ha area is mined the area will be rehabilitated prior to the opening of a third minor area. Considering this, the current project proposal will entail the disturbance of ±2.7% of the mining right area (major area) at any given time.

Upon commencement, the proposed project will trigger listed activities (see table below) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and the Environmental Impact Assessment Regulations 2014 (as amended) and therefore requires an environmental

impact assessment (EIA) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources and Energy) when considering the environmental authorisation.

See attached as Appendix C a copy of the site layout plan of the proposed mining activities.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the proposed application.

NAME OF ACTIVITY (E.g. For prospecting – drill site, site camp, ablution facilities, accommodation, equipment storage, sample storage, site office, access route etc... etc... etc E.g. for mining – excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	AERIAL EXTENT OF THE ACTIVITY Ha or m^2	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE (GNR 324, GNR 325, GNR 326 OR GNR 327)
Application for a mining right	238.5426 ha	X	GNR 325 LN 2 Activity 15, 17 GNR 327 LN 1 Activity 12, 19, 28
Listing Notice 2 Activity 15: *The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*			
Listing Notice 2 Activity 17: *Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the mining right.*			
Listing Notice 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;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*			

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Listing Notice 1 Activity 19: *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.*			
Listing Notice 1 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.*			
Demarcation of the site with visible beacons.	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	N/A	Not listed
Stripping and stockpiling of topsoil of the processing-, and stockpile areas & establishment of site infrastructure.	1.5 ha (processing area)	X	GNR 325 LN 2 Activity 15, 17 GNR 327 LN 1 Activity 12, 28
Stripping and stockpiling of topsoil of the proposed mining areas & establishment of site infrastructure.	2.5 ha / minor area (max. 5 ha at a time)	X	GNR 325 LN 2 Activity 15, 17 GNR 327 LN 1 Activity 12, 28
Excavation and/or pumping of sand.	2.5 ha / minor area (max. 5 ha at a time)	X	GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 12, 19, 28
Screening and washing the recovered material at the processing plant.	1.5 (processing area)	X	GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 12, 28
Stockpile the mined material until it is transported to, alternatively collected by clients.	1.5 (processing area)	X	GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 12, 28
Replacing the topsoil, and reinstatement of the mined area prior to moving to another minor area.	±2.5 ha / minor area	X	GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 28
Final rehabilitation and closure of the mining right.	Remaining 5 ha minor areas plus the 1.5 ha processing area	X	GNR 325 LN 2 Activity 17

ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

1. BACKGROUND INFORMATION

Blazecor 226 CC (hereafter referred to as Blazecor) holds a mining permit (MP) to mine sand from the banks of the Sand River over a portion of Portion 0 of the farm De Klerks Kraal No 231, in the Theunissen District. The Blazecor mining permit was valid until 14 March 2020, upon which the DMRE approved the subsequent three renewals. The third renewal of the mining permit is valid until 14 March 2023. The table below lists the GPS coordinates of the Blazecor mining footprint (4.8 ha).

Table 3: GPS coordinates of the Blazecor mining permit area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	28º08'24.92"	26º40'14.65"	-28.140256º	26.670736º
B	28º08'23.65"	26º40'18.43"	-28.139903º	26.671786º
C	28º08'18.07"	26º40'17.08"	-28.138353º	26.671411º
D	28º08'15.59"	26º40'19.16"	-28.137663º	26.671988º
E	28º08'14.11"	26º40'17.97"	-28.137252º	26.671658º
F	28º08'13.30"	26º40'15.59"	-28.137028º	26.670997º
G	28º08'14.65"	26º40'13.73"	-28.137403º	26.670481º
H	28º08'19.07"	26º40'10.17"	-28.138631º	26.669492º
I	28º08'19.78"	26º40'10.60"	-28.138828º	26.669611º
J	28º08'19.39"	26º40'10.60"	-28.138719º	26.669611º

Figure 1: Satellite view showing the location of the MP area (white polygon) in relation to the surrounding landscape. (Image obtained from Google Earth).

2. PROJECT PROPOSAL

Vengablox (Pty) Ltd (hereafter referred to as Vengablox) applied for a mining right over ±239 ha of Portion 0, and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 from where sand will be mined from the Sand River as well as adjacent to it. Vengablox entered into an agreement with Blazecor to apply for the proposed mining right over the current mining permit area of Blazecor. Refer to Appendix F2 for a copy of this agreement.

The table below lists the GPS coordinates of the proposed mining area as shown on the Regulation 2(2) Mine Plan attached as Appendix A.

Table 4: GPS coordinates of the proposed mining area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	28º08'30.08"	26º39'05.39"	-28.141689º	26.651496º
B	28º08'15.33"	26º39'28.64"	-28.137591º	26.657956º
C	28º08'22.60"	26º39'42.58"	-28.139611º	26.661827º
D	28º08'14.18"	26º39'52.30"	-28.137272º	26.664529º
E	28º08'13.90"	26º40'05.35"	-28.137194º	26.668152º
F	28º08'03.78"	26º40'19.05"	-28.134384º	26.671957º
G	28º08'20.02"	26º40'43.87"	-28.138894º	26.678852º
H	28º08'03.36"	26º40'46.99"	-28.134266º	26.679719º
J	28º07'57.21"	26º41'17.71"	-28.132559º	26.688252º
K	28º07'39.27"	26º41'44.66"	-28.127575º	26.695738º
L	28º07'56.16"	26º41'46.76"	-28.132268º	26.696321º
M	28º08'00.53"	26º41'37.49"	-28.133481º	26.693746º
N	28º08'11.85"	26º41'28.46"	-28.136626º	26.691238º
P	28º08'15.33"	26º40'59.56"	-28.137592º	26.683212º
Q	28º08'28.76"	26º40'59.15"	-28.141321º	26.683096º
R	28º08'38.27"	26º40'46.86"	-28.143964º	26.679683º
S	28º08'20.29"	26º40'19.55"	-28.138970º	26.672098º
T	28º08'27.50"	26º40'11.92"	-28.140971º	26.669979º
U	28º08'27.19"	26º39'58.16"	-28.140887º	26.666156º
V	28º08'36.86"	26º39'42.70"	-28.143572º	26.661860º
W	28º08'30.96"	26º39'30.11"	-28.141932º	26.658365º
X	28º08'48.06"	26º39'01.46"	-28.146683º	26.650406º

The satellite image below shows the location of the proposed mining area in relation to the surrounding landscape.

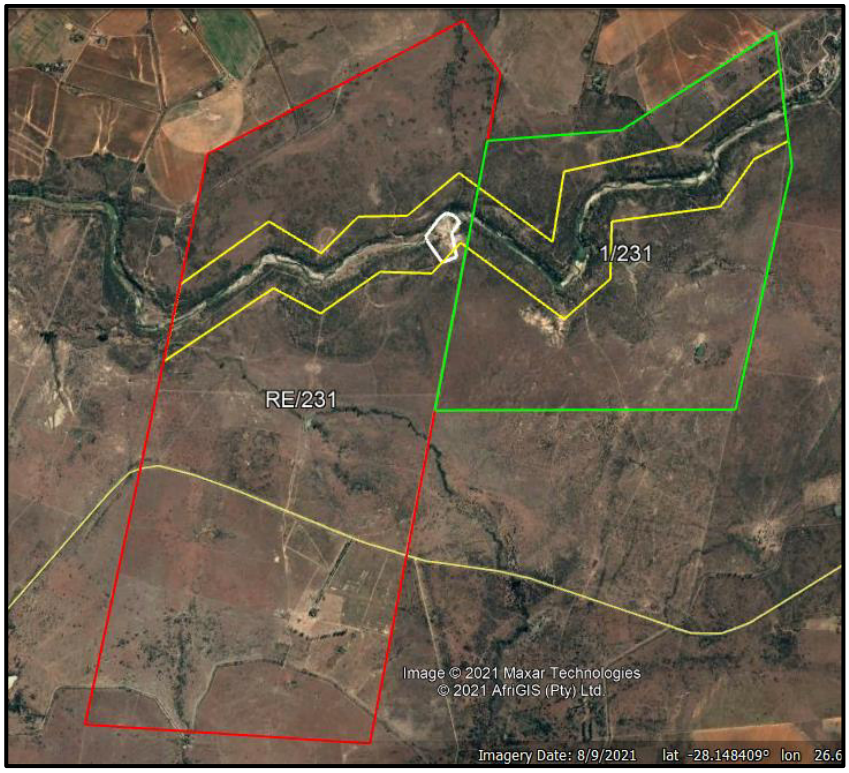


Figure 2: Satellite view showing the location of the proposed mining area (yellow polygon) in relation to the surrounding landscape where the white polygon indicates the Blazecor mining permit area, the red polygon shows Portion 0 of De Klerks Kraal No 231, and the green polygon shows Portion 1 (Remaining Extent) of De Klerks Kraal No 231. (Image obtained from Google Earth)

Should the MR be issued and the mining of sand be allowed, the proposed project will comprise of activities that can be divided into three key phases (discussed in more detail below) namely the:

(1) *Site establishment/construction phase* which will involve the demarcation of the first two minor area's boundaries, as well as the boundary of the designated processing area and buffer/no-go areas. Site establishment will further necessitate the clearing of vegetation, stripping and stockpiling of topsoil, and establishment of site infrastructure.

(2) *Operational phase* that is presently expected to entail the simultaneous mining of two (2) minor areas within the footprint of the major mining right area as discussed in more detail below. The estimated footprint of a single minor area will be ±2.5 ha, with an additional 1.5 ha needed for the operation of the processing plant. Therefore, the footprint of the operational areas will calculate a maximum of ±6.5 ha at any given time (should both minor areas be operational). The sand will be mined by direct excavation (floodplain) and agitating sand pumps (riverbed). The sand will be loaded by excavator onto trucks that will transport it to the screening- and washing plant, after which it will be stockpiled until sold and transported to clients.

(3) *Decommissioning phase* which will include activities that can be divided into medium- and long-term categories. In the medium term, rehabilitation will entail the continuous reinstatement of mined minor areas. In the long term, rehabilitation will comprise the reinstatement of all remaining disturbed areas (mining related) prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). The right holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the mining right holder will be required to submit a closure application to the DMRE in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998.

2.1 SITE ESTABLISHMENT PHASE

Site establishment will entail the demarcation of the mining boundaries (of the first two minor areas) the buffer/no-go areas, and the processing area; clearance of vegetation from the floodplain (where necessary), and the stripping and stockpiling of topsoil to access the sand and establish the mining related infrastructure and stockpile area (floodplain) as detailed below:

2.1.1 Demarcation of Mining Boundaries

Pursuant to receipt of an Environmental Authorisation (EA) and Mining Right (MR), and prior to mining, the boundary of the mining footprint has to be demarcated. However, because of the size of the mining right footprint (±239 ha), the installation of beacons along the outer mining boundaries is deemed impractical. The Applicant therefore proposes to demarcate the boundaries of each operational minor area (±2.5 ha) as well as the processing area. Additional thereto, the 38 m buffer around the river channel, the wetland conditions (marginal- and lower zone), all lateral drainage lines and backwater wetlands will be demarcated and managed as no-go areas, with the exception of one entrance point into the river channel (at a time), where minimal access will be needed to allow for the placement and operation of the proposed sand pump as discussed in more detail below.

2.1.2 Clearing of Vegetation

(Also refer to Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology, Geohydrology and Groundcover (including wetlands))

The proposed mining area extends across Highveld Alluvial Vegetation (AZa5) that forms part of the Grassland Biome. The earmarked mining area includes the riverbed of the Sand River, as well as an area extending ±200 m to the north and south of the riverbed. If approved, the Applicant intends to mine sand from both the riverbed and the adjacent floodplain/riparian area. The Wetland and Riparian Assessment (WRA) reports that the

floodplain/riparian zone of the Sand River along the section in the study area is extensive, and in most areas cover the entire extent of the proposed mining area, i.e. 200 meters in width on both the northern and southern banks. The Riparian IHI (Index of Habitat Integrity) of the study area is classified as Category C: Moderately Modified. The EIS (Ecological Importance and Significance) of the floodplains is considered Moderate. The WRA notes that the biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. No wetland conditions were observed in the floodplains/riparian zone.

As reported in the WRA, the floodplain/riparian zone is dominated by a low shrub layer, scattered trees, and well-developed riparian thicket, with a poorly developed grass layer dominated by pioneer species, a few succulent species, as well as exotic weeds. In this circumstance, the removal of the vegetation layer will be necessary to access the resource and establish the mining infrastructure. The intention is to minimize the removal of vegetation to only the affected areas (immediately prior to mining), and to in the end restore the footprint (riparian/floodplain area) to land suitable for grazing upon closure of each minor area, and ultimately the lapse of the mining right.

As mentioned earlier, only one entrance point (at a time) will be allowed into the river channel to allow for the placement and operation of the proposed sand pump. The entrance point will be demarcated to prevent sprawling and will be reinstated immediately after the pump is moved to another location along the MR footprint. The entrance into the river channel will be carefully selected to minimise disturbance of the marginal zone and avoid steep banks of the river.

2.1.3 Topsoil Stripping and Stockpiling

It is proposed that topsoil removal will be restricted to the exact footprint of each minor area to be mined during the operational phase of the activity. The topsoil will be stockpiled at a designated signposted area within the boundary of each minor area to be replaced during the rehabilitation of the area. It will be part of the obligations of site management to prevent the mixing of topsoil heaps with overburden/other soil heaps. The complete A-horizon (the top 100 – 200 mm of soil which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil will be stripped. The topsoil berm will measure a maximum of 2 m in height to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.

2.1.4 Access Roads

The Applicant will use the existing gravel farm roads, that provide access to the farms (both north and south of the river) from tertiary roads (surfaced north of the river, and gravel south of the river) that ultimately connect with the R30 provincial road to the east, to access the mining areas and transport material from the mine. Haul roads will be extended into the mining area as mining progresses, the Applicant will strive to confine these roads to the existing internal farm roads. However, should haul roads be needed where no farm roads exist the footprint of the haul roads will be contained to the approved mining area, specifically to areas where mining still needs to be done. No haul roads will be allowed over rehabilitated areas and upon closure of the site all haul roads will be ripped and rehabilitated if no longer needed by the landowners. The building/upgrading of farm roads will not exceed the thresholds of the listed activities in terms of the NEMA EIA Regulations, 2014 (as amended).

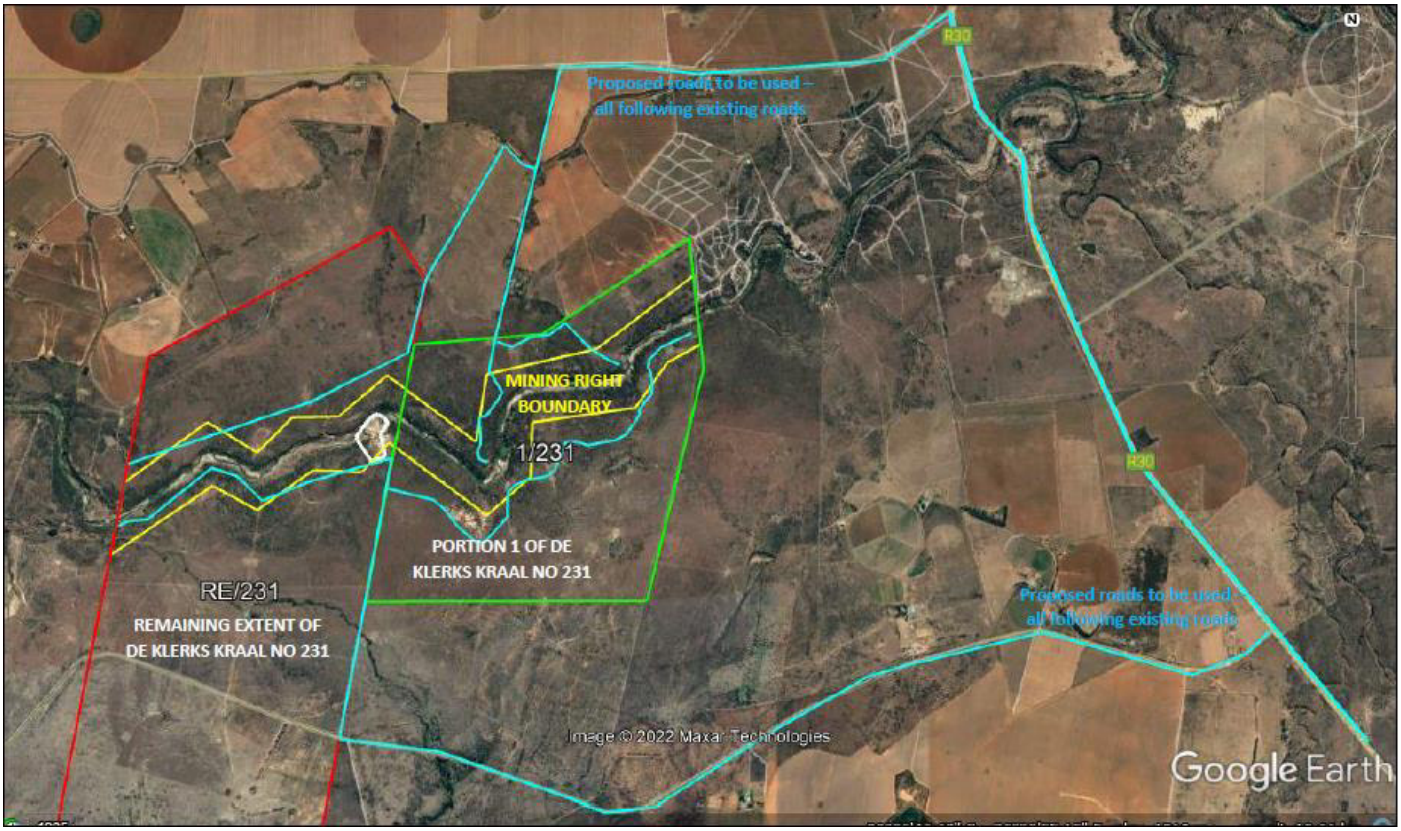


Figure 3: Schematic representation of the roads (blue lines) to be used upon approval of the mining right, where the mining area is indicated by the yellow polygon, the green polygon shows the boundaries of De Klerks Kraal No 231/1, and De Klerks Kraal No 231/RE is shown by the red polygon (image obtained from Google Earth).

2.1.5 Establishment of Site Infrastructure

(Also refer to Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology, Geohydrology and Groundcover (including wetlands))

The processing area will be established in the floodplain/riparian area outside the proposed 38 m buffer/no-go areas. The following site infrastructure will be established within the footprint of the processing area (1.5 ha):

- Ablution Facilities;
- Buildings for administration, storage, and workshop purposes;
- Diesel depot (<23 m^3);
- Generators;
- Internal roads;
- Parking area;
- Screening- and washing plant;
- Settling pond; and
- Wash bay.

No infrastructure other than a settling pond will be established in each minor area (2.5 ha). A sand pump will be placed inside the river channel that will be connected to the associated settling pond (in the minor area) via a pipeline. As mentioned earlier, only one sand pump will be used in the river at any given time. Apart from the sand pump and associated pipeline, no other infrastructure will be established inside the river channel, marginal- and/or lower zones, the lateral streams or backwater wetlands.

2.1.5.1 Stormwater Management

(Information extracted from the Storm Water Management Plan attached as Appendix I. Also refer to Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology, Geohydrology and Groundcover (including wetlands))

The stormwater management plan (SWMP) identified two areas with the potential of producing dirty stormwater, namely the processing/stockpiling area and the sand extraction or excavation along the banks of the river.

Processing/Stockpiling Area:

The processing/stockpiling area will be managed holistically to prevent dirty stormwater from exiting these areas. The SWMP reports that flooding of the processing/stockpile area remains likely but should be very infrequent, especially if a 38-meter buffer is retained from the banks of the river. Flood protection structures such as berms will however be implemented and maintained.

In accordance with the specifications of the SWMP the ablution facilities will drain into a septic tank that will be emptied by a registered service provider when needed (closed system). No french drains will be established on site. The facility will be placed further than 38 m from the edge of the riverbank and will be included inside the flood protection berm. All petrochemicals/fuel and/or other hydrocarbons will be stored in bunded area (with a capacity of 1.5 times the volume of the tank) that will be lined with concrete. The storage of hazardous waste will also be contained in a bunded area with impermeable surface, outside the 1:100-year floodline of the river. The footprint of the workshop and washbay will be lined with concrete, and an oil separator will be installed at the washbay. The design of all haul roads will incorporate adequate stormwater management measures such as v-drains, culverts, stormwater berms and erosion control measures such as gabions where erosion is problematic. Settling ponds will be erected on the site for the sand washing as well as to capture stormwater from the site.

In addition to the above, it is proposed that clean stormwater will be diverted around the processing/stockpile area by means of berms. Dirty stormwater will be contained within the processing area by the construction of cut-off trenches and berms around the area (see following figure). The approximate dimensions of both the berm and trench will be 1 m deep/high and 2 m in width and will retain an aspect ratio of 1:2 height/depth to width. As directed in the SWMP the berm facing the river will be of such design as to prevent flooding of the site and plant during flooding events in the river. Retaining the 38 m buffer between the processing/stockpile area and the riverbank will further improve stormwater management and prevent contamination of surface water within the Sand River. When the area is rehabilitated, care will be taken to establish an indigenous vegetation layer as quickly as possible, while erosion monitoring and remediation will be continuously implemented. The monitoring and maintenance of the berms, cut-off trenches and other stormwater management measures will be a continuous management activity.

Figure 4: Approximate representation of the recommended berm and cut-off trench system (image obtained from the SWMP).

Sand Excavations:

The extraction, pumping and excavation of sand will occur separately from the processing/stockpile area and will take place within the main channel and banks of the Sand River. The sand extraction via pumps will occur directly from the main channel and here stormwater management will not be possible. The infrastructure associated with it will be situated on the banks of the river (within the minor mining area) and any disturbance of the banks, alluvial sandbanks and main channel will be kept to a minimum.

The excavation of sand from the proposed minor areas will form a void, pit or trench which will be largely inward draining and will therefore not contribute to dirty stormwater runoff. Excavations will however act as a water trap for clean stormwater runoff and as a result the SWMP recommended that berms be erected around excavations to divert clean stormwater around the excavations and into the natural drainage pattern. Topsoil will be stored adjacent to the excavation that may cause sedimentation runoff and/or erosion. As a result, a berm will be constructed around these smaller stockpiles and excavations of which the stockpiles' slope angle will be kept to a minimum. The liberation of sediments will be kept to a minimum and erosion along the access roads will be monitored and remedied. To limit the risk of groundwater contamination the excavation of sand will be restricted to 300 mm above the groundwater table.

The flooding of the excavations and subsequent forming of artificial wetland areas will be prevented as far as possible by levelling bench cuts and excavation pits, and rehabilitating excavation areas before opening the consecutive mining (minor) area as presented in the following figure. An irregular surface topography will be avoided as far as possible.

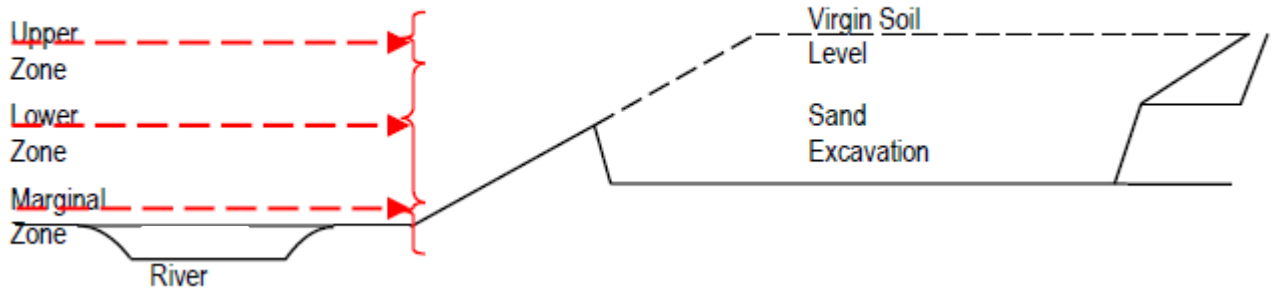


Figure 5: Simplified representation of the excavation of sand from bench cuts and levelling of resultant excavation (image obtained from the SWMP).

Also refer to the Stormwater Management Map attached as Appendix I for a visual representation of the storm water measures to be implemented on site. This will however be utilised as a guideline and adjusted where necessary.

2.1.6 Existing Infrastructure

No permanent infrastructure, other than those associated within the sand mining activities at the Blazecor mining permit area, has been established within the application area, that could be affected by the proposed activity.

2.2 OPERATIONAL PHASE

The Applicant proposes to mine sand from both the riverbed (Sand River), as well as the adjacent floodplain/riparian area within the approved mining footprint. Mining will be conducted during normal working hours (07:00 – 17:00) from Monday to Saturday. No mining or processing will take place on Sundays or after sunset.

2.2.1 Sand Mining from the Riparian Area

The mining method to be used will resemble small scale opencast mining, where the sand will be mined from the earmarked area (±2.5 ha/minor area) along benches. An excavator will load the sand onto trucks that will transport it to the screening- and washing plant, after which it will be stockpiled until sold and transported to clients. In addition, to the direct excavation of the sand by excavator, the Applicant may also implement the use of an agitating sand pump to mine the sand from the bottom of the sand pit. Water runoff from the washing plant and sand pit will be collected in settling ponds and reused at the plant and/or sand pump. The possibility of releasing clean excess water from the settling ponds back into the river has been submitted as part of the water use licence application to be approved by the DWS. The release of water back to the river will only take place if/when approved by the DWS.

As mentioned earlier, it is proposed that a maximum of two (2) minor areas will be mined at any given time. The estimated footprint of a minor area will be ±2.5 ha, with an additional 1.5 ha needed for the processing area. Therefore, the operational footprint will calculate to ±6.5 ha (2.7% of the mining right area) at any given time. All excavation- and processing areas will be established outside the 38 m buffer proposed by the WRA (discussed earlier). See the following figure for a schematic representation of the proposed division of the mining right footprint (major area) into ±2.5 ha minor areas with a designated processing- and stockpiling area of 1.5 ha, as well as the preliminary Site Activities Plan attached as Appendix C.

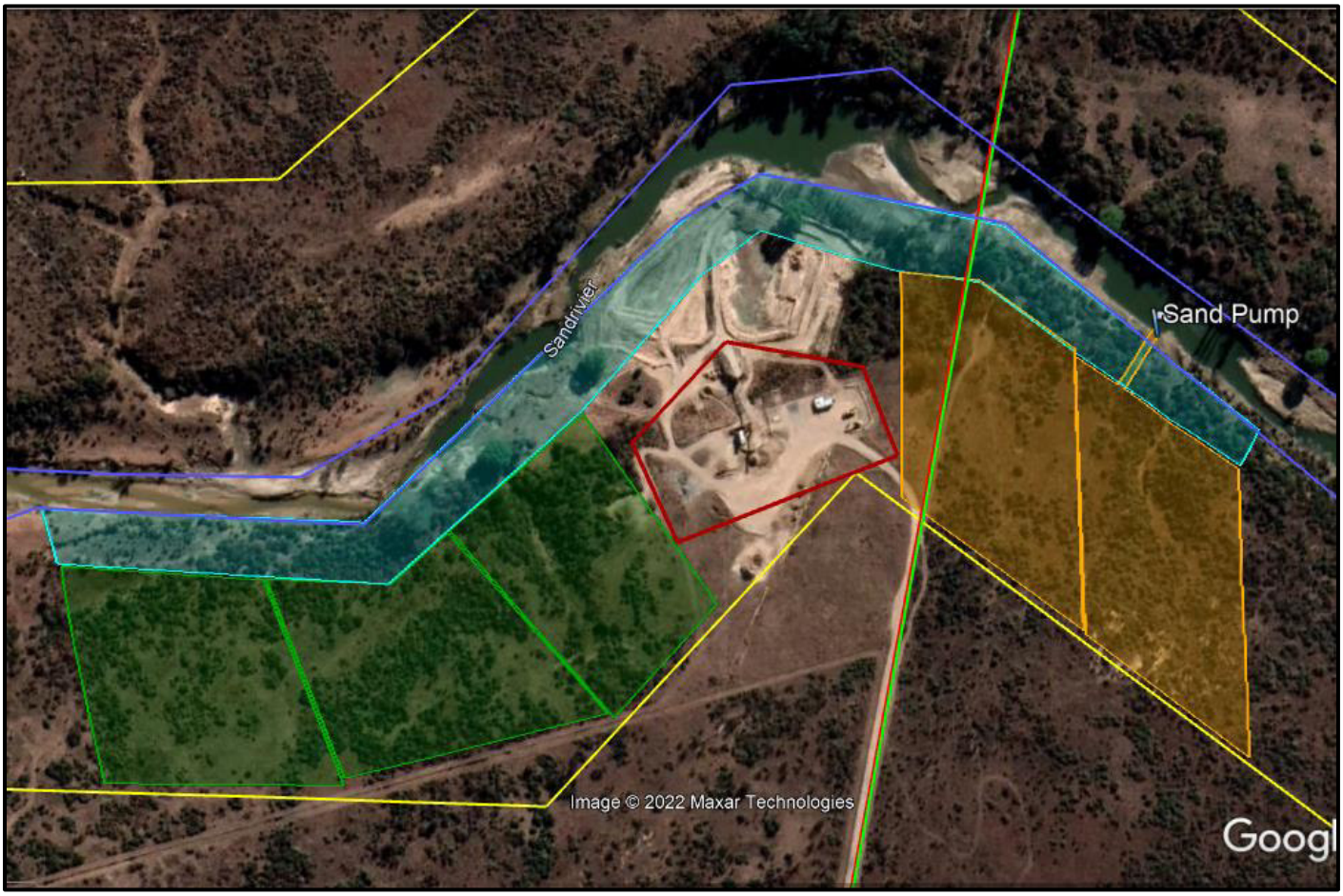


Figure 6: Schematic representation of how the mining right footprint (yellow polygon) will be mined in smaller areas of ±2.5 ha (orange shaded blocks), the green blocks illustrate rehabilitated minor areas. The light blue shaded polygon represents the proposed 38 m buffer along the river. The designated processing- and stockpiling area (1.5 ha) is indicated by the brown polygon (image obtained from Google Earth).

The mining activities are expected to entail the following:

- Site establishment;
- Clearing of vegetation;
- Stripping and stockpiling of topsoil of the operational areas;
- Excavation and/or pumping of sand;
- Screening and washing of sand;
- Stockpiling of the sand until it is sold; and
- Replacing the topsoil and reinstatement of the mined block prior to moving to a new minor area.

2.2.2 Sand Mining from the Riverbed

In addition to the abovementioned mining of sand from the riparian area, the Applicant also proposes to mine sand from the riverbed. It is proposed that the sand will be pumped with an agitating sand pump from the riverbed into the adjacent sand pit (in the riparian area),

where the water will either syphon through the floor of the pit or be pumped to the associated settling pond. Once in the sand pit, the sand will be mined as prescribed earlier. As discussed earlier, only one sand pump will be used in the river at any given time, with a single access made to allow for the installation and operation of the pump.

2.2.3 Water Management

The Applicant intends to use water from the Sand River to wash the sand products and control dust within the mining footprint. As mentioned earlier, the water needed for the washing plant will be recycled to minimise the need for supplement water. A water use application for the abstraction of water from the river, operation of settling ponds, release of water back into the river, as well as the mining of sand from, and adjacent to the riverbed was submitted to the DWS for consideration and approval. Should the DWS not approve the proposed abstraction of water from the river, the Applicant will use water from an existing borehole on the farm, currently used by the existing sand mine on the property.

(Also refer to Part A(1)(g)(iv)(1)(c) *Descripton of specific environemntal features and infrastructure on the site – Site Specific Hydrology, Geohydrology and Groundcover (including wetlands);* Part B(1)(d)(vii) *Volumes and rate of water use required for the mining, trenching or bulk sampling operation*; Part B(1)(d)(viii) *Has a water use licence been applied for*).

2.2.4 Waste Management Programme

The general waste to be generated during the operational phase of the project will mainly consist of paper, plastic, glass, metal and potentially tin that will be contained in sealable refuse bins that will be removed to the Theunissen landfill site when the capacity of the containers is reached.

Hazardous waste will mainly be the result of accidental spillages or breakdowns. Such contaminated areas will immediately (within first hour of the occurrence) be cleaned and the contaminated soil will be contained in a designated hazardous waste bin that will be kept at the processing area outside the 1:100 year floodline of the river. The hazardous waste will be collected from the site by a registered hazardous waste handling contractor.

The Applicant will place ablution facilities at the processing area that could be used by the employees. As mentioned earlier, the ablutions will drain into a closed system septic tank, and no french drains will be established on site.

2.2.5 Electricity

The mining operations will be powered by generators as there are no electricity infrastructure within the earmarked footprint.

2.2.6 Servicing and Maintenance

When needed, mining equipment will be serviced at the workshop in the designated processing area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays will be used under the machinery and all waste will be contained and removed from the emergency service area to the workshop to ensure proper disposal.

2.3 DECOMMISSIONING PHASE

Rehabilitation will include activities to be divided into medium- and long-term categories. In the medium term, rehabilitation will entail the continuous reinstatement of mined minor areas, and the management of weeds and invasive plant species. In the long term, rehabilitation will involve the reinstatement of the remaining disturbed areas (mining related), prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). The MR holder will further be responsible for the seeding of all rehabilitated areas.

The decommissioning activities will consist of the following:

- Sloping and landscaping the excavations;
- Removing all stockpiled material;
- Removing all mining machinery and equipment from site;
- Landscaping all disturbed areas and replacing the topsoil;
- Vegetating the reinstated area; and
- Controlling/monitoring the invasive plant species.

The future land use of the rehabilitated mining footprint will be agriculture. Upon the replacement of the topsoil, the area will once again be available for grazing purposes, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed land use.

The Applicant proposes the following about rehabilitation of the mined blocks (see Appendix N for the Closure Plan):

- The mine plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating each mining block as mining continues.
- After mining, any steep slopes at the edges of excavations will be reduced to a minimum and profiled to blend with the surrounding topography.
- The stockpiled topsoil will then be evenly spread over the disturbed mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying layer. The depth will be monitored during spreading to ensure that coverage is adequate and even.

- The Applicant will strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.
- A cover crop (indigenous vegetation) that ties in with the proposed land use will be planted immediately after spreading of topsoil to stabilize the soil and protect it from erosion. The cover crop will be fertilised for optimum biomass production.
- The rehabilitated area as well as the land down slope of it will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- The Applicant will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated area. The invasive plant species management plan (Appendix L) will continually be implemented on site.

The Applicant will also comply with the minimum closure objectives as prescribed by the DMRE and detailed below:

Rehabilitation of the excavated area:

The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material (if any) removed from the excavation must be dumped into the excavation.

No waste may be permitted to be deposited in the excavations.

Once overburden and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.

The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from closure of the site.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Rehabilitation of processing area:

Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.

Stockpiles must be removed during the decommissioning phase, the area ripped, and the topsoil returned to its original depth to provide a growth medium.

On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):

- Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10 cm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMRE Regional Manager.

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMRE Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

Final rehabilitation:

Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and invasive plant species clearing.

All mining equipment, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).

Waste material of any description, including receptacles, scrap, rubble, and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.

The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site.

Final rehabilitation shall be completed within a period specified by the Regional Manager.

Once the entire mining area was rehabilitated the MR Holder is required to submit a closure application to the Department of Mineral Resources and Energy in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

Also refer to Part B(1)(d)(i) *Determination of closure objectives* and Appendix N for the Closure Plan.

e) Policy and Legislative Context

Table 5: Policy and legislative context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);	REFERENCE WHERE APPLIED (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g. in terms of the National Water Act: Water use license has/has not been applied for).
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	Part A(1)(g)(iv)(1)(b) Description of the current land uses. Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Invasive Plant Species.*	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017).	Part A(1)(f) Need and desirability of the proposed activities.	The need and desirability of the project was assessed in accordance with these guidelines.
Hazardous Substances Act, 1973 (Act 15 of 1973)	Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Waste Management.*	The mitigation measures proposed for the site includes specifications of the HAS, 1973.
Lejweleputswa Integrated Development Plan (IDP)	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – *Socio-economic Environment.*	The description of the study area's socio-economic status is in accordance with that of the IDP.
Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHSA regulations.	Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Health and Safety Risks.*	The mitigation measures proposed for the site includes specifications of the MHSA, 1996.
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) read together with applicable amendments and regulations thereto.	Part A(1)(d) Description of the scope of the proposed overall activity.	Application for a mining right. Reference number: FS 30/5/1/2/2/10071 MR
National Environmental Management Act,1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended): ❖ GNR 325 Listing Notice 2 Activity 15	Part A1(d)(i) Listing and specified activities.	Application for environmental authorisation. Reference number: FS 30/5/1/2/2/10071 MR

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
❖ GNR 325 Listing Notice 2 Activity 17 ❖ GNR 327 Listing Notice 1 Activity 12 ❖ GNR 327 Listing Notice 1 Activity 19 ❖ GNR 327 Listing Notice 1 Activity 28		
National Environmental Management: Air Quality Control Act, 39 (Act No 39 of 2004) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Air Quality and Noise Ambiance.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Air Quality and Noise Ambiance*.	The mitigation measures proposed for the site consider the NEM:AQA, 2004 and the National Dust Control Regulations.
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.	Part A1(g)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Mining, Biodiversity and Vegetation.*	Should Final Layout Alternative be approved, and the proposed mitigation measures be implemented the potential impacts on the biodiversity of the area is deemed to be of moderate significance. The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) read together with applicable amendments and regulations thereto. NEM:WA, 2008: National norms and standards for the storage of waste (GN 9260).	Part A(ii) Description of the activities to be undertaken: 2.2.4 *Waste Management Programme* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Waste Management*.	The mitigation measures proposed for the site consider the NEM:WA, 2008.
National Heritage Resources Act No 25 of 1999.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Human Environment.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of	The mitigation measures proposed for the site includes specifications of the NHRA, 1999.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	risk – *Cultural and Heritage Environment.*	
National Road Traffic Act, 1996 (Act No. 93 of 1996)	Part A(ii) Description of the activities to be undertaken: *2.1.4 Access Roads.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Existing Infrastructure.*	The mitigation measures proposed for the project consider the NRTA, 1996.
National Water Act, 1998 (Act No. 36 of 1998) read together with applicable amendments and regulations thereto. Department of Water Affairs and Forestry Best Practice Guideline Series (2007).	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Hydrology, Geohydrology and Groundcover (including wetlands).* Part B(1)(d)(viii) Has a water use licence been applied for?	A water use application was submitted to the Department of Water and Sanitation in terms the National Water Act, 1998 (Act No. 36 of 1998). Should the Final Layout Alternative be approved, and the proposed mitigation measures be implemented the potential impacts on the hydrology of the area is deemed to be of moderate significance. The mitigation measures proposed for the site consider the NWA, 1998.
Public Participation Guideline in terms of the NEMA EIA Regulations.	Part A(1)(g)(ii) Details of the Public Participation Process Followed	Public participation was conducted in accordance with the public participation guidelines.
The South African Constitution.	Implied throughout the document.	To be upheld throughout the EIA assessment, planning-, construction-, operational- and decommissioning phases.

DW755 Summary Report - De Klerkskraal 2 (WU22656)

WATER USER INFORMATION
Type of Water User: Company, business, partnership or community
Name of Water User: Vengablox Pty Ltd (2013/013444/07)
Equity Status: W: BBBEE (HAI owned companies complying with BBBEE standards)
Primary Contact: Mr Machiel du Plessis Cell: +27834108286 Tel: 0577331626 Email: machiel@wzbeton.co.za
APPLICATION INFORMATION
Application Name: De Klerkskraal 2
Ref No: WU22656
Province: Free State **WMA:** Vaal **Quat:** C42L
Sector: Mining
Activity: Sand
Description of Activities in Relation to the Water Use Application: The proposed mining footprint will be 238.5426 ha from where sand will be mined from the Sand River as well as adjacent to it. The mining method will resemble small scale opencast mining, where the sand will be mined along benches. An excavator will load the sand onto trucks that will transport it to the processing plant, after which it will be stockpiled until sold and transported to clients. In addition, to the direct excavation of the sand, the Applicant may also implement the use of agitating sand pumps to mine the sand from the bottom of the sand pit and riverbed.

Optional Title Deed	Deeds - Wimanzi Pty Ltd Murchellin Saal 2/24/2022 3:24:51 PM
DECLARATION BY APPLICANT	
I Mrs Murchellin Saal (Environmental Consultant) herewith electronically sign this Application. I hereby confirm that the information provided is True and Accurate. Electronically signed by me on 3/1/2022 10:22:42 AM. My contact number during Office hours is +27767926327. This declaration was done by me in my designation as signatory : Environmental Consultant.	

Figure 7: Water use application loaded onto the e-WULAAS system of DWS.

Figure 8: Confirmation that the WULA was submitted to the DWS.

f) Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Sand mining commenced in 2018 on Portion 0 of the farm De Klerks Kraal No 231, Theunissen, within the permit area of Blazecor. The sand of this area is of excellent quality and is sold to the building-, civil-, and construction industries within the Free State Province.

Vengablox subsequently identified the need to apply for a mining right over the earmarked area (±239 ha) to secure the sand resource for future sales and prolong the lifespan of the existing sand mine (presently in the name of Blazecor). The increase in building-, construction- and road maintenance projects in the vicinity of the properties motivated the need for the continued operation of the sand mine.

The mining permit area of Blazecor will be incorporated into the proposed mining right footprint, and Blazecor and Vengablox has therefore entered into an agreement in this regard (see Appendix F2). Should the mining right be granted, Vengablox proposes to take over the rehabilitation liability of the mining permit area, and therefore the mining right application was accompanied by a Transfer of Environmental Liabilities Application.

The proposed labour component of the operation is approximately 16 employees including top management. In terms of the Social and Labour Plan (SLP), to be approved as part of the proposed mining right application, the Applicant has an obligation to contribute to Human

Resource Development and Local Economic Development (LED) that further supports the development of the local socio-economic environment.

The need and desirability of the proposed operation was assessed in terms of the National Department of Environmental Affairs' Guideline on Need and Desirability (first version published in terms of section 24J of the NEMA in 2014, and second version in 2017). The following table shows the questions that were considered in this regard.

Table 6: Need and desirability determination.

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How were ecological integrity considerations taken into account? How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?	Refer to the following sections: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken; ❖ Part A(1)(g)(i) Details of the development footprint alternatives considered; ❖ Part A(1)(g)(iv) The environmental attributes associated with the development footprint alternatives; ❖ Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity; ❖ Part A(1)(k) Environmental impact statement.	Desirable
How will this development pollute and/or degrade the biophysical environment?	Due to the small scale (of each minor area) and nature of the proposed sand mining activity the pollution potential is of low significance. The mining method proposes continued reinstatement of mined areas, thereby keeping the impact on the receiving environment as low as possible. Also refer to: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.5.1 Stormwater Management; ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.4 Waste Management Programme; ❖ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk.	Desirable
What waste will be generated by this development?	Due to the nature of the project, very little general waste is expected to be generated as a direct result of the mining activities. The general waste will mainly consist of paper, plastic, glass, metal and potentially tin that will be contained in sealable refuse bins that will be removed to the Theunissen landfill site when the capacity of the containers is reached. Likewise, very little generation of hazardous waste is expected. Hazardous waste will mainly be the result of accidental spillages/breakdowns, contaminated water from the wash bay, and hydrocarbon contaminated soil/items from the operations at the workshop. The hazardous waste to be generated will be kept in designated hazardous waste containers to be removed from the site by a registered hazardous waste handling contractor.	Highly Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
	Ablution facilities connected to a closed system septic tank will be available to the employees. No waste will be disposed of or treated on the mining area/farm.	
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	A Heritage Impact Assessment (HIA) (inclusive of a palaeontological opinion) compiled by Beyond Heritage did not identify any archaeological sites of significance within the study area (239 ha). The palaeontologist confirmed that the potential for disturbance or destruction of quaternary palaeontological resources was considered negligible.	Highly Desirable
How will this development use and/or impact on non-renewable natural resources?	The Applicant proposes to sell the sand to be mined from the earmarked footprint to the local market in and around the mine. Presently, it is believed that the proposed area may have an inferred sand reserve of >18 000 000 m^3. Based on the proposed production rate, the sand resource shows a potential life of mine of >400 years. Therefore it is believed that the Applicant will responsibly consumes the sand resource of the study area. Further to this, the sand deposit (in the riverbed) will annually be replenished by the Sand River during periods of high flow, and therefore the mining of sand from the riverbed was identified as a feasible business opportunity that will also bring about the diversification of income on the properties, extending it from agriculture to include small scale mining.	Highly Desirable
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part?	The proposed mine will make use of generators to power the site infrastructure and use water from the Sand River if approved by the DWS, alternatively from an existing borehole on the property. The water to be used at the washing plant will be directed to settling ponds from where the water can be re-used thereby creating a closed circuit to ensure water efficiency and lessen the associated water need.	Desirable
How were a risk-averse and cautious approach applied in terms of ecological impacts?	Refer to the following sections: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken; ❖ Part A(1)(g)(i) Details of the development footprint alternatives considered; ❖ Part A(1)(g)(iv) The environmental attributes associated with the development footprint alternatives; ❖ Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity; ❖ Part A(1)(k) Environmental impact statement.	Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How will the ecological impacts resulting from this development impact on people's environmental right?	Should the management- and mitigation measures proposed in this document be implemented in conjunction with the conditions of the EA, and water use license (to be approved by the DWS), no impacts could be identified that will impact on the people's environmental right.	Highly Desirable
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts.	The Applicant entered into usage agreements with the two landowners as well as with Blazecor that is a lawful occupier of Portion 0 of De Klerks Kraal No 231. The Blazecor sand mine is already well known in the surrounding community and to date no serious environmental or socio-economic impacts were identified. Further to this, the revenue to be generated by the mine will be an additional source of income (rental) to the landowners. If approved, the mine intends to employ at least 16 residents and contribute to the community as part of its SLP obligations. Also refer to: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.5.1 Stormwater Management; ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.4 Waste Management Programme; ❖ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk; ❖ Part A(1)(k) Environmental impact statement; ❖ Part A(1)(u)(i)(1) Impact on the socio-economic conditions of any directly affected person.	Highly Desirable
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The WRA notes that if the proposed mining method (direct excavation from the floodplain) is maintained, the risk is anticipated to be moderate. This is however subject to comprehensive mitigation and rehabilitation measures being implemented. The WRA further notes that the main impacts associated with the pumping of sand from the river will affect geomorphology, the aquatic fauna dependant on the sandy habitat, and cause local modification of the bank. If however, the extraction areas are limited to the 5 ha (sand excavations) at a time, and to one extraction point at a time, the extent of the impact should be limited and confined to the site. The risk is therefore anticipated to remain moderate. Also refer to: ❖ Part A(1)(g)(iv) The environmental attributes associated with the development footprint; ❖ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected; ❖ Part A(1)(k) Environmental impact statement.	Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified, resulted in the selection of the "best practicable environmental option" in terms of ecological considerations	Kindly refer to the following sections of this report: ❖ Part A(1)(g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site; ❖ Part A(1)(g)(i) Details of the development footprint alternatives considered; ❖ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected; ❖ Part A(1)(g)(x) Statement motivating the alternative development location within the overall site.	Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What is the socio-economic context of the area?	Please refer to Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity - Socio-economic Environment.	Highly Desirable
Considering the socio-economic context, what will the socio-economic impacts be of the development, and specifically also on the socio-economic objectives of the area?	If approved, the De Klerks Kraal Sand Mine proposes to be a highly regarded supplier of sand in the Theunissen community. The mine will further also contribute directly to the greater society through the employment of 16 locals as well as the Local Economic Development (LED) commitments of the mine (stipulated in the SLP). Indirectly, the mine will contribute to infrastructure development in the surrounding area (sand supplier), and the spending of wages in the Theunissen area.	
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The mine intends to supply sand to the building industry in the Theunissen and greater Lejweleputswa area. In addition, the mine will be committed to Human Resources Development, Local Economic Development as prescribed in the SLP. The potential impact of the proposed activity on the physical, psychological, cultural, or social needs of the community will be assessed as part of the following EIA phase.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
	Also refer to the discussion under Heading 2(k) *The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.*	
Will the development result in equitable impact distribution, in the short- and long-term?	The De Klerks Kraal Sand Mine intends to employ 16 people from the local community for the duration of the mining right (±30 years). This is of crucial importance in the LDM with an unemployment rate of 38.8%. Further to this, the mine will have to operate in accordance with the provisions of the MPRDA as well as the Employment Equity Act, 1998 giving preference to historically disadvantaged employees from within the local area in terms of employment.	Highly Desirable
In terms of location, describe how the placement of the proposed development will contribute to the area.	The sand resource on Portion 0 of De Klerks Kraal No 231 has been mined since 2018, and the existing mine is a well-known sand supplier in the area. The proposed expansion of the mining activities to the rest of Portion 0 and Portion 1 (Remaining Extent) of De Klerks Kraal No 231 will increase the production capacity of the mine, as well as prolong the validity of the mining authorisation, extending it from the allowable 5 years (maximum) for a mining permit, to ±30 years allowed for a mining right. The landowners also can diversify the income of their properties by expanding the use from agriculture to include small scale mining.	Highly Desirable
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	The mitigation measures proposed in this report were compiled in consultation with the specialists to reduce the potential impact that the proposed activity may have on the receiving environment. Once approved, the management outcomes are legally binding to be implemented by site management for the duration of the site establishment-, operational- and decommissioning phases.	Highly Desirable
How will the socio-economic impacts resulting from this development impact on people's environmental right?	Should the management- and mitigation measures proposed in this document be implemented in conjunction with the conditions of the EA, and water use license (to be approved by the DWS), no impacts could be identified that will impact on the people's environmental right.	Highly Desirable
Considering the linkages and dependencies between human wellbeing, livelihoods, and ecosystem services, describe the linkages and dependencies applicable to the area in question	The Applicant entered into usage agreements with the two landowners as well as with Blazecor that is a lawful occupier of Portion 0 of De Klerks Kraal No 231. The Blazecor sand mine is already well known in the surrounding community and to date no serious environmental or socio-economic impacts were identified. Further to this, the revenue to be generated by the mine	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
and how the development's socio-economic impacts will result in ecological impacts?	will be an additional source of income (rental) to the landowners. If approved, the mine intends to employ at least 16 residents and contribute to the community as part of its SLP obligations. Also refer to: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.5.1 Stormwater Management; ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.4 Waste Management Programme; ❖ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk; ❖ Part A(1)(k) Environmental impact statement; ❖ Part A(1)(u)(i)(1) Impact on the socio-economic conditions of any directly affected person.	
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations? What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons?	The mitigation measures proposed in this report are compiled in consultation with the specialists to reduce the potential impact that the proposed activity may have on the receiving environment. Once approved, the management outcomes are legally binding to be implemented by site management for the duration of the site establishment-, operational- and decommissioning phases. Also refer to the discussion under: ❖ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected; ❖ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk.	Desirable
What measures were taken to pursue equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	The mine operates in accordance with, amongst others, the following: ♦ CARA, 1983 – to ensure agriculture related compliance; ♦ Financial Provision Regulations, 2015 – to ensure compliance in terms of rehabilitation; ♦ Mine Health and Safety Act, 1996 (as amended) – to ensure employee safety; ♦ MPRDA, 2002 (as amended) – to ensure mining related compliance; ♦ NEM:AQA, 2004 – to ensure air quality related compliance;	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	♦ NEM:BA, 2004 – to ensure biodiversity related compliance; ♦ NEM:WA, 2008 – to ensure waste related compliance; ♦ NEMA, 1998 (as amended) – to ensure environmental related compliance; Should the proposed application be approved the mining area will also be subject to compliance with the above listed.	
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community that is consistent with the priority needs of the local area.	The mine intends to supply sand to the building industry in the Theunissen and greater Lejweleputswa area. In addition, the mine must meet the commitments of the SLP regarding Human Resources Development, Local Economic Development, and the process pertaining to management of downscaling and retrenchment.	Highly Desirable
What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected.	The mine must operate in accordance with the specifications of the Mine Health and Safety Act, 1996 (MHSA). Site management will have daily discussions with the staff regarding the work to be performed and the environment in which the work will take place. Grievances/concerns can be lodged during the daily site meetings. The MHSA further requires the submission of quarterly occupational hygiene reports that record site specific occupational hygiene exposure assessments.	Highly Desirable
Describe how the development will impact on job creation in terms of, amongst other aspects?	The Applicant intends to appoint 16 employees (including top management) should both minor areas be operational simultaneously. These employees will be sourced from the local community.	Highly Desirable
What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that	The proposed mine will operate under a valid environmental authorisation and mining right to be issued by the DMRE-FS. Compliance of the site with the approved EMPR and EA conditions will be reported on as per departmental specification. Considering this, the proposed activity will take place in an environmentally sustainable manner with the least possible impact on the receiving environment. The Applicant will also have to comply with the conditions/requirements of the water use authorisation to be issued by the DWS.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
the environment will be protected as the people's common heritage.		
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left.	It is believed that the mitigation measures proposed in this document is realistic and can be implemented (when applicable) by the mine. Should the mined areas be rehabilitated successfully, no long-term management burden will be left behind.	Highly Desirable
What measures were taken to ensure that the costs of remedying pollution, environmental degradation, and consequent adverse health effects and of preventing, controlling or minimising further pollution environmental damage or adverse health effects will be paid for by those responsible for harming the environment.	In terms of Section 41 of the MPRDA, 2002 a mining right holder must submit a financial provision to the DMRE that is sufficient to rehabilitate or manage the negative environmental impacts related to the mining activity. Upon approval of this application, Vengablox (Pty) Ltd will lodge a financial guarantee with the DMRE that will be deemed sufficient to cover the financial provision amount needed to rehabilitate the mining footprint. The environmental liability of the operation will annually be reviewed and if a shortfall is indicated, the guarantee will be accordingly adjusted.	Highly Desirable
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified, resulted in the selection of the best practicable environmental option in terms of socio-economic considerations	Kindly refer to the following sections of this report: ❖ Part A(1)(g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site; ❖ Part A(1)(g)(i) Details of the development footprint alternatives considered; ❖ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected; ❖ Part A(1)(g)(x) Statement motivating the alternative development location within the overall site.	Desirable
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope, and nature of the project in relation to its location and other planned developments in the area.	Refer to the discussion under Part A(1)(g)(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.	

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

During the EIA phase, the potential impact of the proposed activities on the receiving environmental were assessed by, amongst others, the archaeologist, ecologist, hydrologists, and palaeontologist. The specialists considered the initial project proposal and accordingly submitted their respective recommendations. Following receipt of the specialist reports, the initial project proposal was refined to accommodate their findings. The following matters contributed to the identification of the preferred development option:

1. **Topography -** The proposed activity will impact the topography of the earmarked footprint in that the virgin soil level of the floodplain/riparian area will be reduced as simulated in Figure 5. The depth of the mining activities will be limited to ±300 mm above the groundwater table.

2. **Visual Characteristics –** Due to the topography of the area, the proposed footprint will mainly be visible from immediate surrounding areas. From the viewshed analysis it is shown that the visual impact of the earmarked footprint will be of medium significance without mitigation. The small scale of the proposed operation (±6.5 ha affected at a time if both minor area is operational), and the proposed progressive rehabilitation, will however assist in mitigating the visual impact of the proposed development on the surrounding environment. No residual visual impact is expected upon closure of the mine.

3. **Air Quality –** The current activities on the property and surrounding environment already impact the air quality and noise ambiance of the study area. Should the mining right be approved, it is expected that the mining operation will generate approximately the same noise levels as the current sand mining operation. Due to the small scale of the operation the noise levels and potential dust impact to be generated at the mine is deemed to be of low significance to the surrounding environment.

4. **Hydrology, Geohydrology and Groundcover (including Wetlands)** – The main channel of the Sand River, wetland conditions along the banks, lateral

stream systems and floodplain wetland areas are all regarded as having a very high sensitivity and should (according to the WRA) where possible be excluded from mining operations. The specialist proposed a 38 m buffer around these areas that is also regarded as having a high sensitivity and must be treated as a no-go area. Mining operations should aim to avoid all areas regarded as having a very high and high level of sensitivity (Figure 41), while focussing operations in areas with moderate sensitivity.

This is not possible where sand excavation takes place from the lower zone or banks of the river and where sand is pumped from the main channel. In such instances, the operational area (stockpile area, sand screen, settling dams and all other associated structures and infrastructure) should at least be located outside these areas of high sensitivity. Only one pump, including infrastructure and access road, should be utilised at any time and the site rehabilitated immediately after moving the pump to another location along the site. The backwater floodplain wetlands and lateral stream systems do not contain sand resources and should therefore be excluded from any mining operations or activities and treated as no-go areas. The sand excavation areas should be limited to an extent of 5 hectares at a time. Sand should be excavated, processed and the area rehabilitated before moving to a new sand mining area.

Any disturbance of the riverbank should be adequately rehabilitated which must include re-instatement of the natural topography, replacement of topsoil, prevention of erosion and monitoring and eradication of problematic weeds and invasives. The extraction of river sand should be conducted sustainably and must not compromise the flow of the river or divert the main flow of the river. Water quality and aquatic habitat integrity must continuously be monitored throughout the operation phase of the activity.

5. **Terrestrial Fauna** – No faunal species of conservation concern were identified within the proposed mining area. All mining must be restricted to daylight hours to minimise the impact on the nocturnal species. Beacons, instead of fences, must be used to demarcate operational areas.

6. **Cultural and Heritage Environment** – No areas of cultural, heritage or palaeontological concern were identified within the proposed site.

7. **Existing infrastructure** – Apart from the mining infrastructure at the Blazecor mining area, no other infrastructure exists on the proposed mining footprint that could be affected by the proposed activity.

i) Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

During the EIA phase the no-go alternative, site alternative, and various layout alternatives was assessed upon receipt of the site-specific information, comments received from the public, and the results of the specialist studies.

Site Alternative:

Site Alternative 1 (S1) (Preferred Alternative): Site Alternative 1 entails the mining of ±239 ha from Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231, within the boundaries of the GPS coordinates listed in Table 4 and depicted in the following figure.

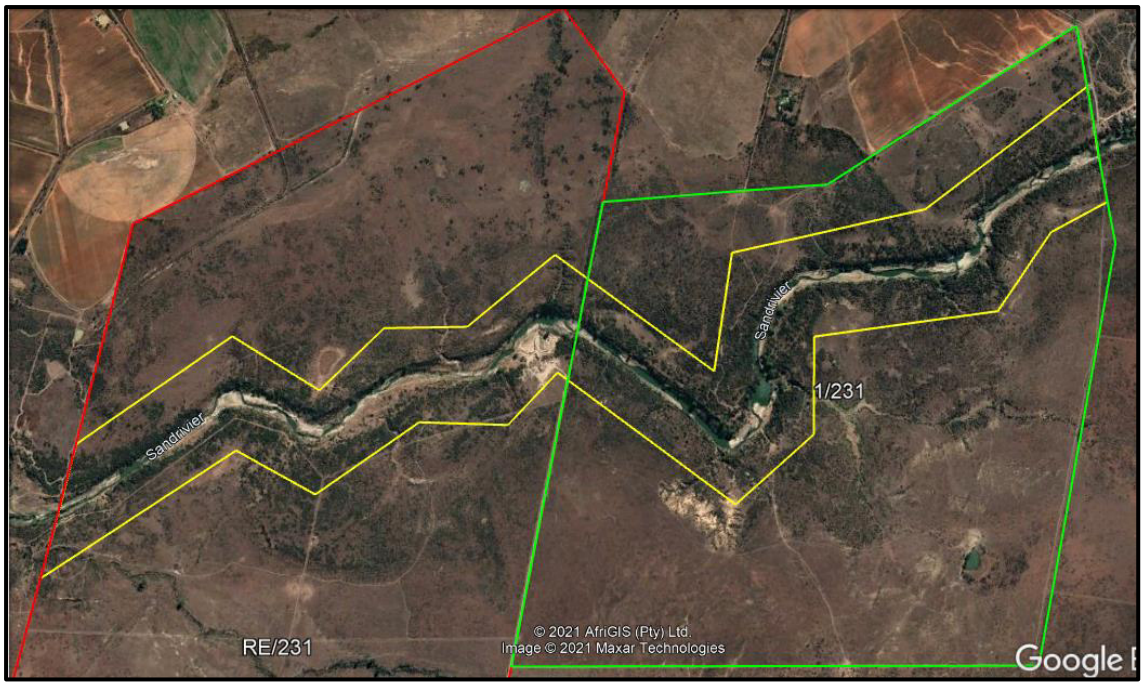


Figure 9: Satellite view showing the position of Site Alternative 1 within the surrounding landscape, where the yellow polygon shows the proposed mining footprint, the red lines show the property boundary of Portion 0 of De Klerks Kraal No 231, and the green polygon indicates the extent of Portion 1 (RE) of De Klerks Kraal No 231. (Image obtained from Google Earth).

S1 is deemed the only viable site alternative as the proposed area extends across the entire riverfront of Portion 0 and 1 of the farm De Klerks Kraal No 231. Moving the application area to the east or west will move it from the properties that the Applicant already have usage agreements with. The application area cannot be moved north or south as it will move the area from the optimal sand resource. Considering this, S1 is deemed the only viable alternative site.

S1 was identified during the planning phase by the Applicant and project team, as the preferred site alternative based on the following:

- The proposed footprint offers the Applicant access to the sand deposits on the properties;
- The proposed mining right footprint is an extension of the existing Blazecor mining permit area (4.8 ha) that has already proven the excellent quality and ample quantity of the sand resource;
- The Sand River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the river;
- The Applicant entered into access agreements with the landowners, as well as Blazecor (as lawful occupier of the property) who in principle support the proposed project;
- The proposed mining method and associated progressive rehabilitation of the mined areas will minimise the visual impact of the activities on the receiving environment.

Layout Alternative:

Final Layout Alternative (FLA) (Preferred Layout): During the EIA phase, the potential impact of the proposed activities on the receiving environmental were assessed by, amongst others, the archaeologist, ecologist, hydrologists, and palaeontologist. The specialists considered the initial layout and accordingly submitted their respective recommendations. Following receipt of the specialist reports, the initial layout of the project was refined to accommodate their findings. This ultimately led to the Final Layout Alternative as proposed in this report.

The FLA entails the following:

- The portioning of the proposed MR footprint into smaller (minor) areas of 2.5 ha each, of which a maximum of two minor areas will be mined at any given time;
  - No infrastructure other than a settling pond will be established in each minor area.
- The excavation areas will be supported by a 1.5 ha processing area;
  - The infrastructure will comprise of ablution facilities connected to a closed system septic tank,
  - Buildings for administration, storage, and workshop purposes;
  - Diesel depot (<23 m^3);
  - Generators;
  - Internal roads;
  - Parking area;
  - Screening- and washing plant;
  - Settling pond; and
  - Wash bay.
- The excavation (minor) areas, and processing area will be established outside the 38 m buffer proposed by the WRA;
- No mining will take place in any of the lateral streams or backwater wetlands identified by the specialist (refer to Figure 41);
- Sand will be mined from the river channel using one sand pump (at any given time), with a single access made to allow for the installation and operation of the pump. The entrance into the river channel will be carefully selected to minimise disturbance of the marginal zone and avoid any steep banks of the river.
  - Apart from the sand pump and associated pipeline, no other infrastructure will be established inside the river channel.
- Stormwater Management will be implemented as proposed in the SWMP attached as Appendix I.
- Progressive rehabilitation will be implemented throughout the operational phase of the project, following which the rehabilitated areas will be vegetated with indigenous plant species.

The FLA is deemed the preferred option as it accommodates the recommendations of both the WRA and the Aquatic Assessment. Should the

FLA be implemented the proposed activity is deemed to be of moderate significance to the receiving environment.

No-go Alternative:

The no-go alternative entails no change to the *status quo* and is therefore a real alternative to be considered. If the no-go alternative is implemented the land use of the earmarked footprint will remain that of agriculture, with the sand resource unmined. The following matters were considered regarding the no-go alternative:

- Should the no-go option be implemented the MR Holder would not be able to mine the sand resources across the larger footprint. This will result in a direct loss of income to Vegablox (Pty) Ltd, and an indirect impact on the (increased) transport costs of clientele;
- The landowners will not receive compensation from the Applicant, and in doing so diversity their income generated from the properties;
- The proposed job opportunities and contributions required in terms of the SLP will be lost to the surrounding community;
- Neither the river channel, wetland conditions (marginal- and lower zones), or floodplain/riparian area will be impacted by sand mining as the agricultural use of these areas will continue.

From the above, it is deduced that Site Alternative 1 in union with the Final Layout Alternative is the preferred project option, as it will best address the potential impacts during the EIA.

ii) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attend public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land).

The relevant stakeholders and I&AP's were informed of the mining right application by means of an advertisement in the Vista, and on-site notices that were placed at the property boundary, intersection of the access roads, as well as in Theunissen. A notification letter inviting comments on the DSR and draft Social and Labour Plan (DSLP) over a 30-days commenting period (ending 14 February 2022) was also sent to the landowners, lawful occupier, neighbouring landowners, stakeholders, and any other I&AP that may be interested in the

project. The stakeholders and I&AP's were also invited to a virtual meeting (26 January 2022) where the project was to be discussed. No attendees registered for the virtual meeting.

The following table provides a list of the I&AP's and stakeholders that were informed of the project:

Table 7: List of the landowners, I&AP's and stakeholders that were supplied with a copy of the DSR & DSLP.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: ❖ Zibeth Botha Familie Trust (changed to Wimanzi (Pty) Ltd since publication of the DSR) Portion 0 of De Klerks Kraal No 231 ❖ Akasia Ontwikkelings (Pty) Ltd Portion 1 (Remaining Extent) of De Klerks Kraal No 231 **Surrounding Landowners and I&AP's:** ❖ Glovalex 88 CC Remaining Extent of Klein Palmiet Kuil No 407 ❖ JC & AJ van der Merwe Familie Trust Portion 1 of Klein Palmiet Kuil No 407 Jordaans Rust No 59 ❖ Land- & Agricultural Development Bank of SA Dankbaarheid No 16 ❖ Premier Access Controls CC Portion 12 of Bryan No 561 Portion 39 of Bryan No 561 ❖ MF Boerdery Trust Portion 38 of Bryan No 561 ❖ Van Jaarsveld Boerdery (Pty) Ltd Portion 32 of Bryan No 561 Portion 36 of Bryan No 561 Portion 37 of Bryan No 561 Portion 7 of De Klerks Kraal No 231 ❖ Micon Group (Pty) Ltd Portion 34 of Bryan No 561 Portion 35 of Bryan No 561 ❖ Rus My Siel Aandeleblokskema (Pty) Ltd Portion 30 of Bryan No 561 ❖ Sibanye Gold Ltd Kleinbegin No 134	❖ Department of Agriculture and Rural Development; ❖ Department of Economic Small Business Development, Tourism and Environmental Affairs; ❖ Department of Labour; ❖ Department of Police, Roads, and Transport; ❖ Department of Public Works and Infrastructure; ❖ Department of Water and Sanitation; ❖ Lejweleputswa District Municipality; ❖ Masilonyana Local Municipality – Ward 7; ❖ Masilonyana Local Municipality; ❖ Matjhabeng Local Municipality; ❖ Matjhabeng Local Municipality – Ward 24; ❖ South African Heritage Resources Agency (SAHRA).

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
❖ Lilian Krowitz Portion 6 of De Klerks Kraal No 231	
LIST OF I&AP'S AND STAKEHOLDERS THAT RESPONDED ON THE DSR	
❖ Department of Economic Small Business Development, Tourism and Environmental Affairs; ❖ SAHRA; and ❖ Mrs H Swart (on behalf of Van Jaarsveld Boerdery (Pty) Ltd).	

The comments and responses received on the DSR were incorporated into the Final Scoping Report (FSR) that was submitted to the DMRE on 15 February 2022 for decision making. Upon approval of the Final Scoping Report (05 April 2022) the Draft Environmental Impact Assessment Report was compiled that was circulated for public comments over a 30-day period that extends until 12 July 2022. The comments received on the draft EIA & EMPR were incorporated into the final EIA & EMPR to be submitted to the DMRE for decision making. See attached as Appendix F proof that the I&AP's and stakeholders were contacted.

iii) Summary of issues raised by I&AP's

(Complete the table summarizing comments and issues raised, and reaction to those responses)

Table 8: Summary of issues raised by I&AP's.

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues Raised**	**EAPs response to issues as mandated by the Applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated**
AFFECTED PARTIES					
Landowner/s		-	-	-	-
Portion 0 of De Klerks Kraal No 231 ❖ Wimanzi (Pty) Ltd (previously owned by Zibeth Botha Familie Trust.	**X**	The landowner is aware of, and supports, the application in principle. Refer to Appendix F2 for a copy of the landowner agreement.			
Portion 1 (Remaining Extent) of De Klerks Kraal No 231 ❖ Akasia Ontwikkelings (Pty) Ltd	**X**	The landowner is aware of, and supports, the application in principle. Refer to Appendix F2 for a copy of the landowner agreement.			
Lawful occupiers/s of the land	-				
Blazecor 226 CC	The Applicant entered into an agreement with Blazecor regarding the proposed mining right application over the existing mining permit area. Refer to Appendix F2 for a copy of the said agreement.				
Landowners or lawful occupiers on adjacent properties	**X**	**-**	**-**	**-**	**-**
Glovalex 88 CC ❖ Remaining Extent of Klein Palmiet Kuil No 407	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
JC & AJ van der Merwe Familie Trust ❖ Portion 1 of Klein Palmiet Kuil No 407 ❖ Jordaans Rust No 59	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Land- & Agricultural Development Bank of SA ❖ Dankbaarheid No 16	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Premier Access Controls CC ❖ Portion 12 of Bryan No 561 ❖ Portion 39 of Bryan No 561	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
MF Boerdery Trust ❖ Portion 38 of Bryan No 561	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Van Jaarsveld Boerdery (Pty) Ltd ❖ Portion 32 of Bryan No 561 ❖ Portion 36 of Bryan No 561 ❖ Portion 37 of Bryan No 561 ❖ Portion 7 of De Klerks Kraal No 231	**X**	18 January 2022	Mrs H Swart requested additional information regarding the MR application, in particular the size of the application footprint, and a map showing the proposed access routes.	This information was provided by Greenmined on respectively 18 and 24 January 2022. The information was shared via WhatsApp as requested by Mrs Swart.	Refer to Appendix F for proof of the public participation process.
Micon Group (Pty) Ltd ❖ Portion 34 of Bryan No 561 ❖ Portion 35 of Bryan No 561	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Rus My Siel Aandeleblokskema (Pty) Ltd ❖ Portion 30 of Bryan No 561	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Sibanye Gold Ltd ❖ Kleinbegin No 134	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Lilian Krowitz ❖ Portion 6 of De Klerks Kraal No 231	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Municipal councillor Ward 24	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Municipality Matjhabeng Local Municipality (MLM)	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA, etc	**X**	**-**	**-**	**-**	**-**
Department of Police, Roads, and Transport	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Department of Water and Sanitation	**X**	05 July 2022	The DWS submitted the following comments on the DEIAR & EMPR.	The comments were incorporated into the FEIAR & EMPR, and as mentioned earlier, the Applicant already applied for the water use licence application.	Refer to Appendix F for proof of the public participation process.

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated

Comments submitted by the DWS upon perusal of the DEIAR:

"1.1 The consultation letter dated June 2022 with reference no: FS 30/5/1/2/2/10071 MR is here by referred to

1.2 Section 21(i) of the National Water Act, 1998 (Act 36 of 1998) (NWA) defines altering the bed, banks or characterises of a watercourse as a water use.

1.3 In terms of Section 22 of the NWA a person may only use water without a licence:
- 1.3.1 If the water use is permissible under Schedule 1.
- 1.3.2 If the water use is permissible as a continuation of an existing lawful use.
- 1.3.3 If that water use is permissible in terms of a General Authorisation issued under Section 39 of the NWA.

1.4 In terms of Section 4(1) of the NWA a person may use water from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1.

1.5 An existing lawful water use is defined, in terms of Section 32 of the NWA, as a water use:
- 1.5.1 Which has taken place at any time during a period of two years immediately before the date of commencement of the NWA. [1 October 1998 for groundwater uses and 1 October 1999 for surface water uses].
- 1.5.2 Which was authorised by or under any law which was in force immediately before the date of commencement of the NWA.
- 1.5.3 Which is a stream flow reduction activity contemplated in Section 36(1) of the NWA.
- 1.5.4 Which is a controlled activity contemplated in section 37(1) of the NWA.
- 1.5.5 Which has been declared an existing lawful water use under Section 33 of the NWA.

1.6 Government Notice No. 398 (GN398) of 26 March 2004 (Gazette No. 26187) General Authorisations in terms of Section 39 of the NWA and determines that water uses are permitted in areas where general authorisations are applicable provided that the uses are within the limits and conditions set out in the General Authorisation.
- 1.6.1 Paragraph 2.7.(1) of GNR398 determines, inter alia, that a person who owns or lawfully occupies property registered at the Deeds Office at the date of the Notice or lawfully has access to land on which the use of water takes place may:
  - (i) On that property or land alter the bed, banks or characteristics of a watercourse if the alteration;
    - (aa) does not impact on a water resource or any other person's water use, property or land;
    - (bb) is not detrimental to the health and safety of the public in the vicinity of the activity.
  - (ii) the natural migration patterns of aquatic biota and the sustainable ecological functioning of the system are not interfered with.

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
(iii) the alteration activity does not extend for more than 50 meters continuously or a cumulative distance of 100 metres on that property or land, measures along the watercourse. (iv) the volume of flow is not reduced except for natural evaporative losses. (v) strict erosion control measures are to be taken during and after construction to ensure no erosion of the bed and banks of the river takes place. (vi) the water quality is not detrimentally affected. (vii) all necessary measures are taken to stabilise the structure and surrounding area. 2. Conclusion: 2.1 if the above conditions or limitation of the General Authorisation are not adhered to the responsible person must apply for authorisation from this Department. To apply for authorisation and registration of water uses the responsible official can be contracted at the following address…..”					
Department of Public Works and Infrastructure	**X**	-	To date no comments were received that could be incorporated into the FEIAR.		
Communities	N/A	No communities border the mining area or were identified within 100 m from the site.			
Dep. Land Affairs	**X**	07 March 2022	The Commission on Restitution of Land Rights confirmed that no land claims appear on their database in respect of the earmarked properties.		Refer to Appendix F for proof of the public participation process.
Traditional Leaders	N/A	No traditional leaders border the mining area or were identified within 100 m from the site.			
Dept. Environmental Affairs	**X**	-	-		

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Department of Economic Small Business Development, Tourism and Environmental Affairs (DESTEA)	X	18 January 2022	Mr Vakalisa Hlazo requested a copy of the DSR & DSLP on behalf of DESTEA for their perusal.	The DESTEA was supplied with an electronic copy of the DSR & DSLP on 19 January 2022, upon which the following comments were received from the DESTEA.	Refer to Appendix F for proof of the public participation process.

Comments received from DESTEA on the DSR & DSLP on 14 February 2022:

"The Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) the Department herby acknowledges receipt of the Draft Scoping Report and the Draft Social and Labour Plan for the above-mentioned development on 19 January 2022.

The above-mentioned reports have been reviewed and found to be in compliance with the minimum requirements as per the EIA Regulations. Please take note of the following when you proceed with the project:

- Ensure that the methods used for sand mining do not lead to the collapse of the riverbank.
- Avoid activities that would lead to the deepening of the riverbed.
- Ensure the protection of the riverine ecology as far as possible and if this is not possible, endangered and/or protected species (if they exist) must be transplanted as far as possible in compliance with the legislation and permits for the translocation of species.
- The mining should continue without causing undue erosion or degradation at the site for development.

Please note that the development cannot commence without Environmental Authorisation from the Department of Mineral and Energy (DMR) and a Mining Permit from the DMR."

Response from Greenmined to the DESTEA on 14 February 2022:

"Greenmined herewith acknowledges, and thank you for, the comments received from the Department on the Vengablox (Pty) Ltd mining right application (FS 30/5/1/2/2/1071 MR) over a portion of Portion 0 and 1 (Remaining Extent) of the farm De Klerks Kraal No 231, in the Theunissen District of the Free State Province. Your comments will be included in the Final Scoping Report (FSR) to be submitted to the DMRE for decision making. If the DMRE, approves the FSR, your comments will also be incorporated into the Environmental Impact Assessment Report that will be made available for your perusal and commenting in due course."

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Other Competent Authorities affected	**-**	**-**	**-**	**-**	**-**
Department of Agriculture and Rural Development	X	-	To date no comments were received that could be incorporated into the FEIAR.		
Department of Labour	X	-	To date no comments were received that could be incorporated into the FEIAR.		
Lejweleputswa District Municipality	X	-	To date no comments were received that could be incorporated into the FEIAR.		
Masilonyana Local Municipality and Ward 7 Councillor	X	-	To date no comments were received that could be incorporated into the FEIAR.		
South African Heritage Resources Agency (SAHRA)	X	17 January 2022	SAHRA submitted the following Interim Comment upon receipt of the DSR & DSLP.	Beyond Heritage (Pty) Ltd was appointed to conduct the requested HIA & PIA during the EIA phase of the project.	Appendix F for the proof of public participation and Appendix J – Heritage Impact Assessment.
Interim comment submitted by SAHRA: "…..The archaeological component of the HIA must follow the SAHRA 2007 Minimum Standards: Archaeological Component of Impact Assessment Report. The quickest process to follow for the archaeological component would be to contract a qualified archaeologist. The proposed development area is in an area of moderate sensitivity in terms of palaeontological resources as per the SAHRIS					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
PalaeoSensitivity map. As such, a desktop Palaeontological Impact Assessment (PIA) must be undertaken by a qualified palaeontologist. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments. Further comments will be issued upon receipt of the above and Draft EIA."				
On 04 March 2022 SAHRA submitted additional comments as presented below: "….It is noted that a Heritage Impact Assessment (HIA) (inclusive of an archaeological and palaeontological studies) will be conducted for the proposed mining right area. The findings of the specialist studies will be incorporated into the DEIA. SAHRA issued an interim comment dated 17/01/2022 which requested the submission of a Heritage Impact Assessment inclusive of an Archaeological Impact Assessment (AIA) and a desktop Palaeontological Impact Assessment (PIA). The Final Scoping Report was submitted to the case on the 15/02/2022. The SAHRA Archaeology, Palaeontology, Meteorite (APM) unit notes the Final Scoping Report, further comments will be issued upon submission of the HIA report and the draft EIA report."				
SAHRA submitted the following additional comments on the project on 07 July 2022. For ease of reference only a summary of the comments is presented here. Please refer to Appendix F for a full copy of the comments. "……SAHRA issued an interim comment dated 17/01/2022 which requested the submission of the Heritage Impact Assessment inclusive of an Archaeological Impact Assessment (AIA) and a desktop Palaeontological Impact Assessment (PIA). The Final Scoping Report was submitted to the case on the 15/02/2022. An interim comment dated 04/03/2022 was issued which noted the Final Scoping Report and requested the submission of the HIA report and the draft EIA report before further comments could be issued. The draft EIA and the HIA documents were submitted to the case on the 09/06/2022…….No structures, graves or heritage finds of significance were identified during the survey. Effects to subsurface heritage resources can be mitigated by implementing the attached chance find procedure. A PIA was conducted by Prof Marion Bamford and the assessment concluded that it is unlikely that fossils would be preserved in the transported sands of the Quaternary and that the impact on the palaeontological heritage would be low. **Interim Comment** The SAHRA Archaeology, Palaeontology, Meteorite (APM) unit notes the HIA and the recommendations provided therein. It is noted that a PIA has been undertaken for the proposed mining, however it has not been attached to the case on SAHRIS. Please submit the PIA report before further comments can be issued…"				
The PIA was loaded as a separate document onto the SAHRIS website on 08 July 2022, and Mr Ngcatsha was informed of the availability of the PIA for his perusal.				
OTHER AFFECTED PARTIES	-	-	-	-
INTERESTED PARTIES	-	-	-	-

iv) The Environmental attributes associated with the development footprint alternatives.

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) Baseline Environment

(a) Type of environment affected by the proposed activity.

(Its current geographical, physical, biological socio-economic, and cultural character).

This section describes the general biophysical-, cultural- and socio-economic environment as well as baseline conditions that may be affected by the proposed project.

PHYSICAL ENVIRONMENT

CLIMATE

(Information extracted from the Specialist Aquatic Assessment attached as Appendix H)

According to SAExplorer the Theunissen normally receives about 421 mm of rain per year, with most rainfall occurring during mid-summer. The chart below (left) shows the average rainfall values for Theunissen per month. It receives the lowest rainfall (1 mm) in July and the highest (75 mm) in January. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Theunissen range from 16.8°C in June to 29.1°C in January. The region is the coldest during June when the mercury drops to 0°C on average during the night. Consult the chart below (right) for an indication of the monthly variation of average minimum daily temperatures.

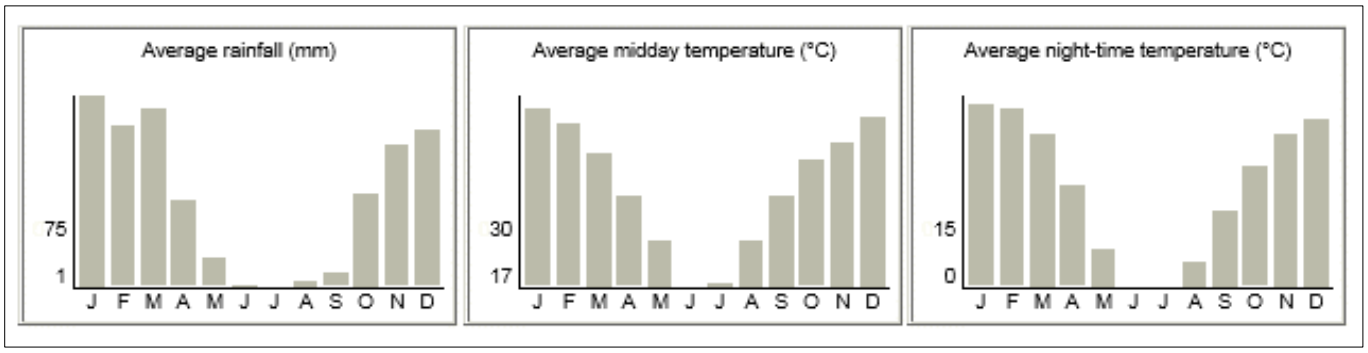


Figure 10: Charts showing the climatic averages of the Theunissen area (information obtained from SAExplorer).

The prevailing wind directions within the area is from the north-north-west to the south-east with a wind probability of 21% and an average wind speed of 7 kts. The figure below shows the annual wind distribution for the Welkom area within proximity to Theunissen.

Month of year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
	01	02	03	04	05	06	07	08	09	10	11	12	1-12
Dominant wind direction													
Wind probability >= 4 Beaufort (%)	22	18	13	9	10	13	15	25	28	34	38	32	21
Average Wind speed (kts)	8	8	7	6	6	6	6	8	8	9	10	9	7
Average air temp. (°C)	27	25	23	19	17	12	13	16	21	24	25	26	20

Figure 11: Annual wind statistics as collected at the Welkom Airport (information obtained from windfinder.com).

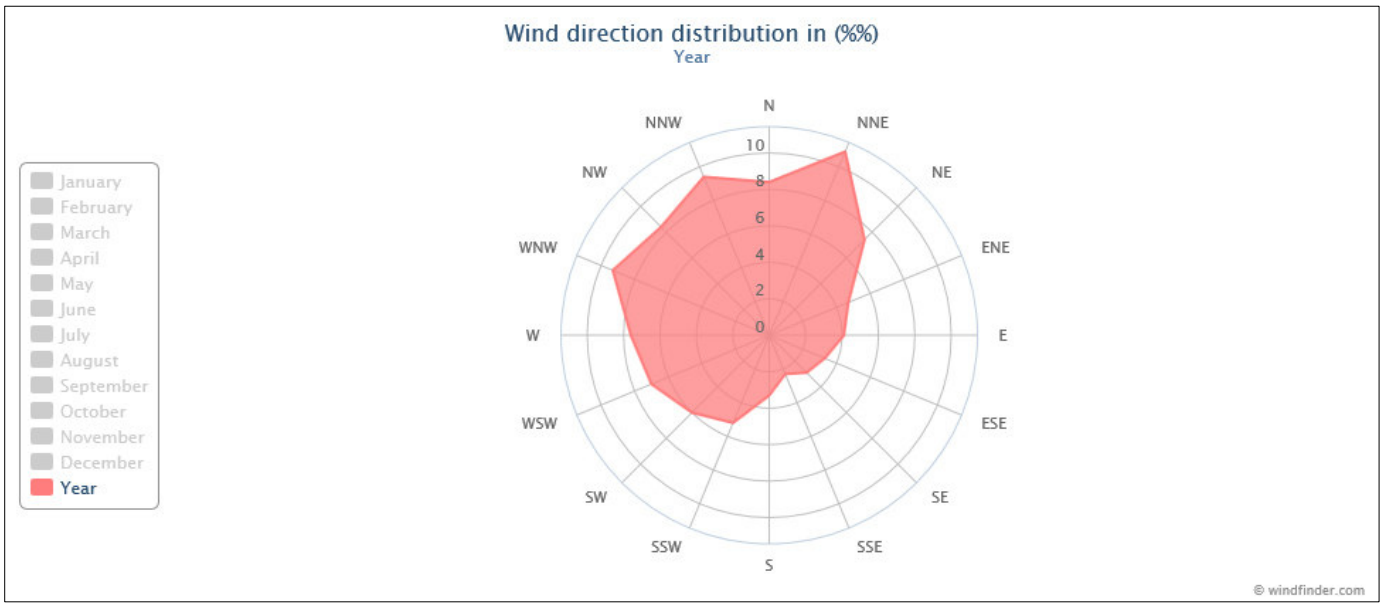


Figure 12: Wind direction distribution in percentage (information obtained from windfinder.com).

TOPOGRAPHY

The topography of the area consists of moderately undulating to flat grassveld plains. The average altitude of the proposed mining area is approximately 1 276 m.a.s.l. The earmarked area is situated along the banks of the Sand River. The river flows from east to west through the site, with the elevation of the riverbed being relatively uniform as depicted in the following figure. At the most eastern point the elevation of the area is at 1 284 masl, upon which the altitude gradually lessens as one moves along the riverbed towards the west. At the most western point of the earmarked area the elevation of the site is at 1 281 masl, resulting in an average slope of -1.2%.

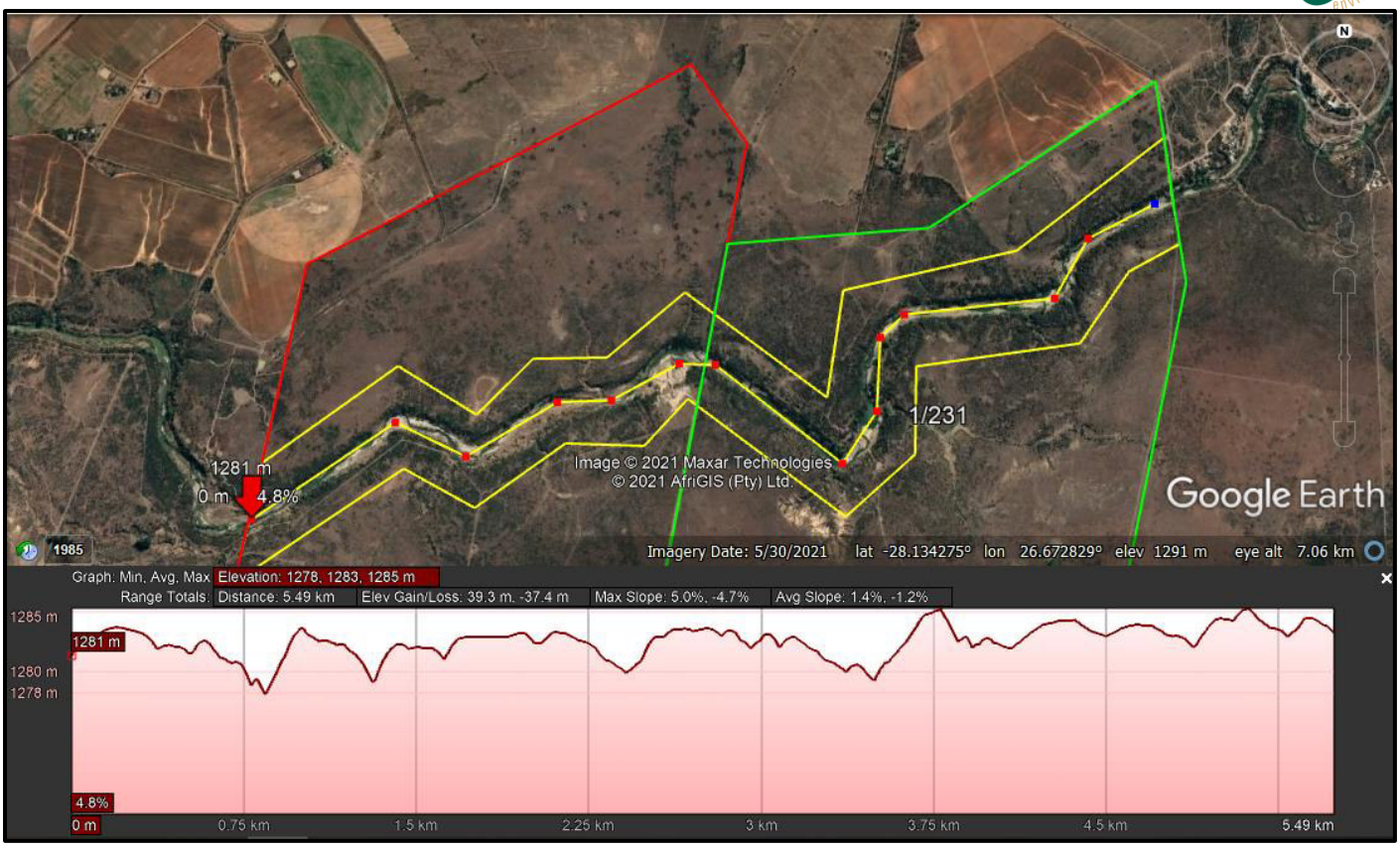


Figure 13: Horizontal elevation profile of the proposed mining area (image obtained from Google Earth).

Vertically the elevation of the site decreases as one moves down the riverbanks towards the riverbed. As depicted in the following figure, the altitude of the northern- and southern riverbanks are uniform.

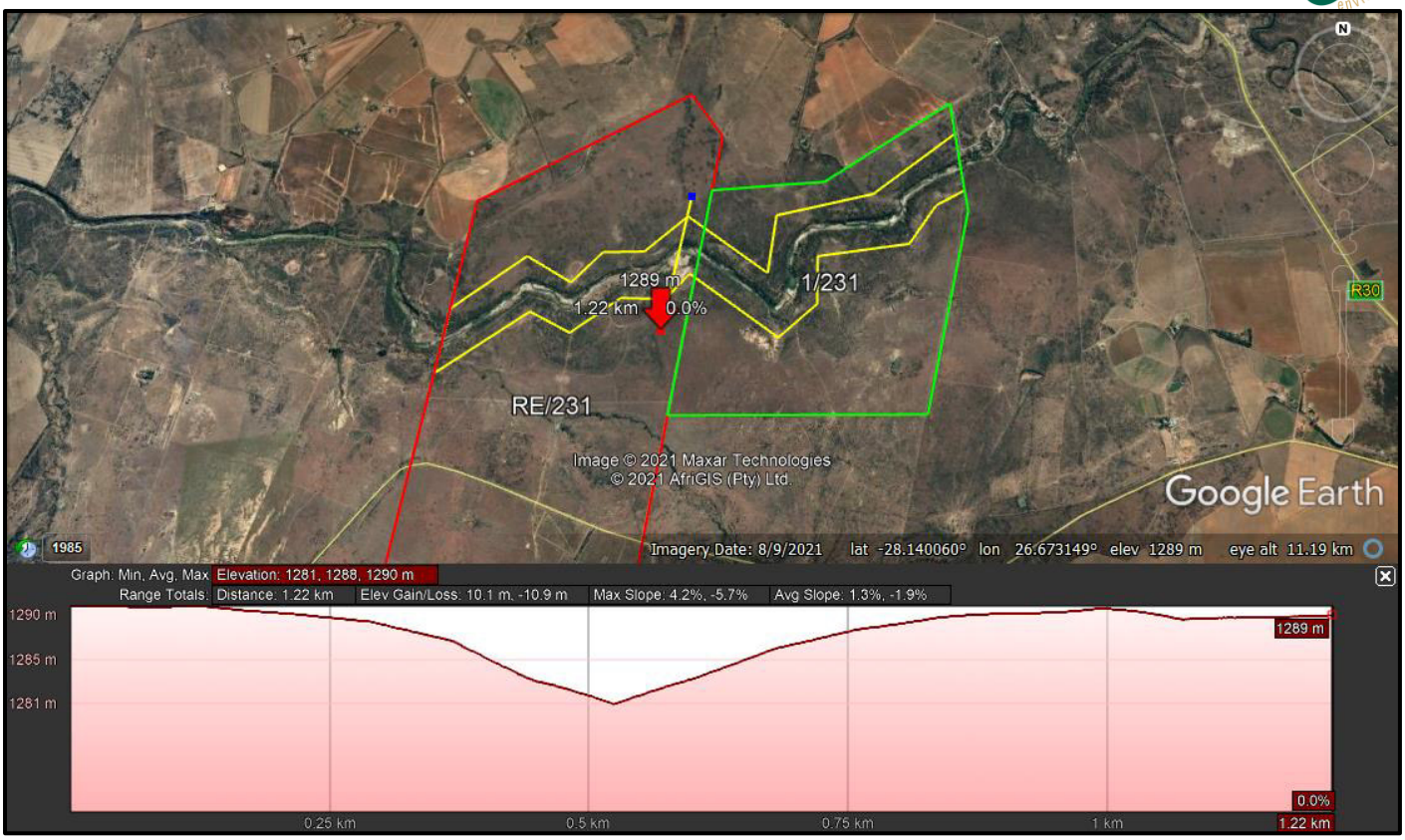


Figure 14: Vertical elevation profile of the proposed mining area. (Image obtained from Google Earth).

VISUAL CHARACTERISTICS

The aesthetic value of the study area is deemed to be of medium to high value. Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 are zoned for agricultural use with a well-established vegetation cover across most of the property (excluding the Blazecor mining area). The riparian fringe of the Sand River has a high aesthetic value, but as one moves away from the river towards the operational part of the farm the aesthetic value decreases slightly as the vegetation cover changes from riverine to grassland.

Owing to the elevation of the site, most of the farm is visible from the east, south, and west. Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Visual Characteristics*.

AIR QUALITY AND NOISE AMBIANCE

The air and noise ambiance of the study area was historically representative of an agricultural environment in which farming equipment operated with occasional dust emissions from denuded areas. The small-scale mining at the Blazecor Sand Mine contributes to the emissions (air & noise) to a slight degree through the movement of excavation- and earthmoving equipment, sand processing, and delivery of sand to clients. Although the above-mentioned developmental changes affect the ambiance of the receiving environment, the study area is still deemed representative of a rural landscape.

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Air Quality and Noise Ambiance.*

GEOLOGY AND SOIL

(Information extracted from the Phase 1 Palaeontological Impact Assessment of a proposed new sand quarry on the farm De Klerkskraal 231, Theunissen, Free State Province, January 2017, (Blazecor MP Application))

The study area is underlain by Karoo Supergroup rocks. These sedimentary rocks form the base on which younger, superficial deposits of late Cenozoic age has been deposited. Dykes and sills of resistant Jurassic dolerites largely determine landscape topography as indicated by the distinctive koppies and flat-topped inselbergs in the region (Rossouw, 2017). The deposits of the Karoo Supergroup in the region are assigned to the Lower Beaufort Group rocks followed by the Adelaide Subgroup. The study area extends across a floodplain, underlain by well-developed overbank sediments.

The WRA notes that the study area is situated on geology associated with the Volksrust Formation. The Volksrust Formation of the Ecca Group in the vicinity of Theunissen is dominated by underlying mudrock. However, the site and surroundings are dominated by quite deep alluvial deposits consisting of fine sand and silt soils.

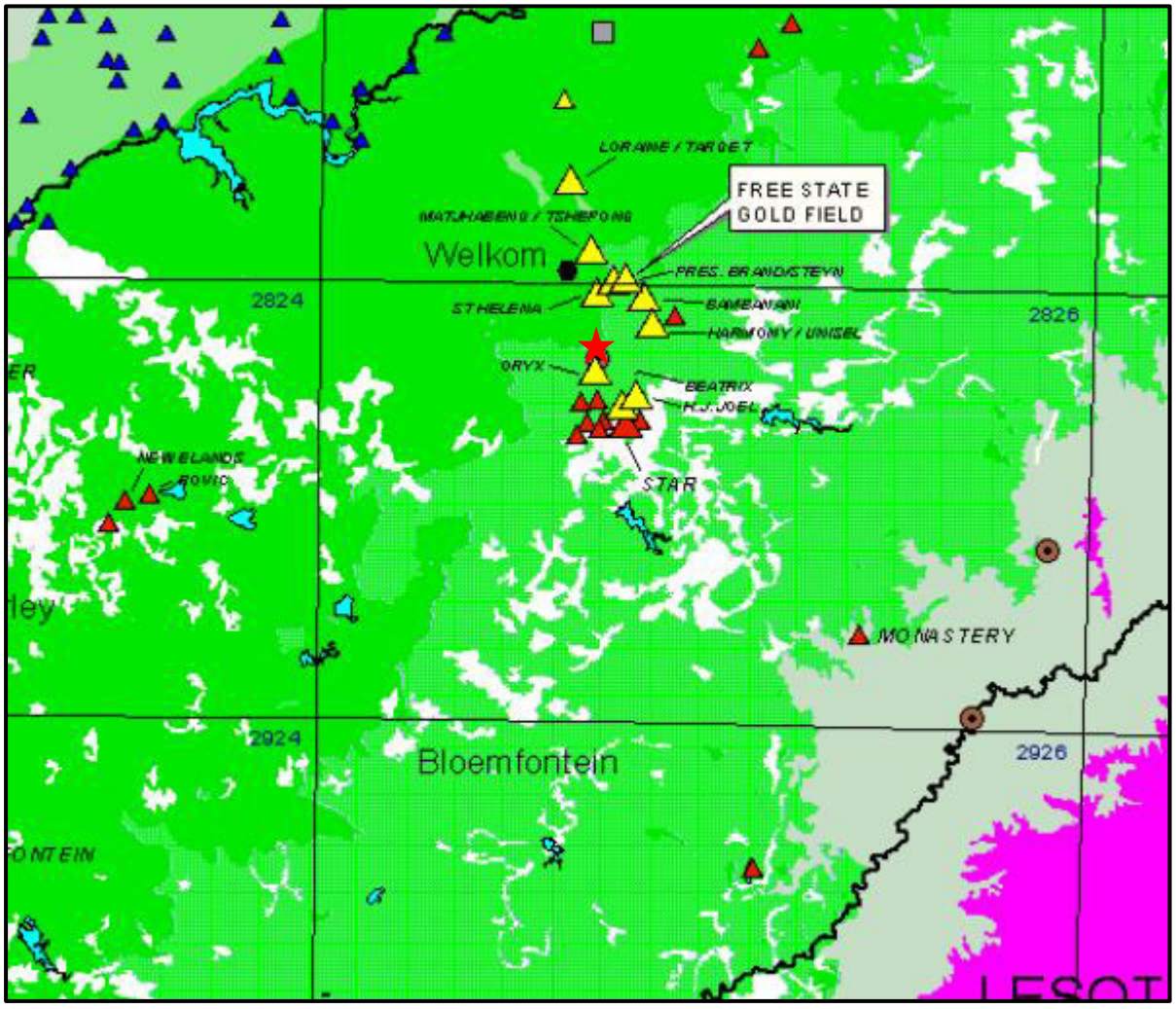


Figure 15: Indication of the simplified geology of the study area, where the solid green colour represents the Dwyka and Ecca Groups, the checkered green colour shows the Beaufort Group (both part of the Karoo Supergroup). The white areas show the intrusive Dolerite, and the study area is indicated by the red star. The yellow triangles indicate gold mines, while the red triangles show the position of diamond (in Kimberlite) mines. (Image obtained from the Council for Geoscience)

HYDROLOGY AND GEOHYDROLOGY

(Information extracted from the Wetland and Riparian Assessment, 2022 attached as Appendix G, as well as the Specialist Aquatic Assessment attached as Appendix H)

The study area is located at the Sand River that falls within quaternary catchment C42L, which forms part of the Middle Vaal Catchment (Sand/Vet sub water management area). The study area falls within the level 1 Ecoregion 11 according to the South African River Health Programme (RHP) and Kleynhans *et al.* (2005).

Shortly after passing Virginia, the Sand River enters the Vet River (±25 km west of the proposed site), which in turn joins the Vaal River in Bloemhof Dam close to Bloemhof town. According to the River Health Programme (2003) the Sand-Vet River System is severely regulated by catchment activities, and it is in fair to poor health. This area is the gold mining capital of the Free State and water from the Vaal, Sand and Vet Rivers

in the area is mainly used for irrigation, mining, and domestic purposes (River Health Programme 2003).

The Sand River is a perennial system that flow from east to west past the site. The river (and the study area) is part of a lowland river system, and the origin of the river is not located near the site. According to the National Wetlands and NFEPA (National Freshwater Ecosystem Priority Areas) map of SANBI the study area is associated with a wetland although it is not a priority wetland. The site does not fall within a FEPA and is therefore not governed by its stringent management guidelines.

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Hydrology, Geohydrology* and Groundcover (including Wetlands).

BIOLOGICAL ENVIRONMENT

MINING AND BIODIVERSITY

(Information extracted from the Mining and Biodiversity Guideline: Mainstreaming Biodiversity into the Mining Sector, Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, 2013).

The Mining and Biodiversity Guideline, compiled by the South African Mining and Biodiversity Forum (SAMBF) provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into planning processes and managing biodiversity during the developmental and operational phases of a mine, from exploration through to closure.

When the position of the study area is placed on the Mining and Biodiversity Map, as shown in the figure below, the proposed mining footprint does not enter any areas of biodiversity importance.

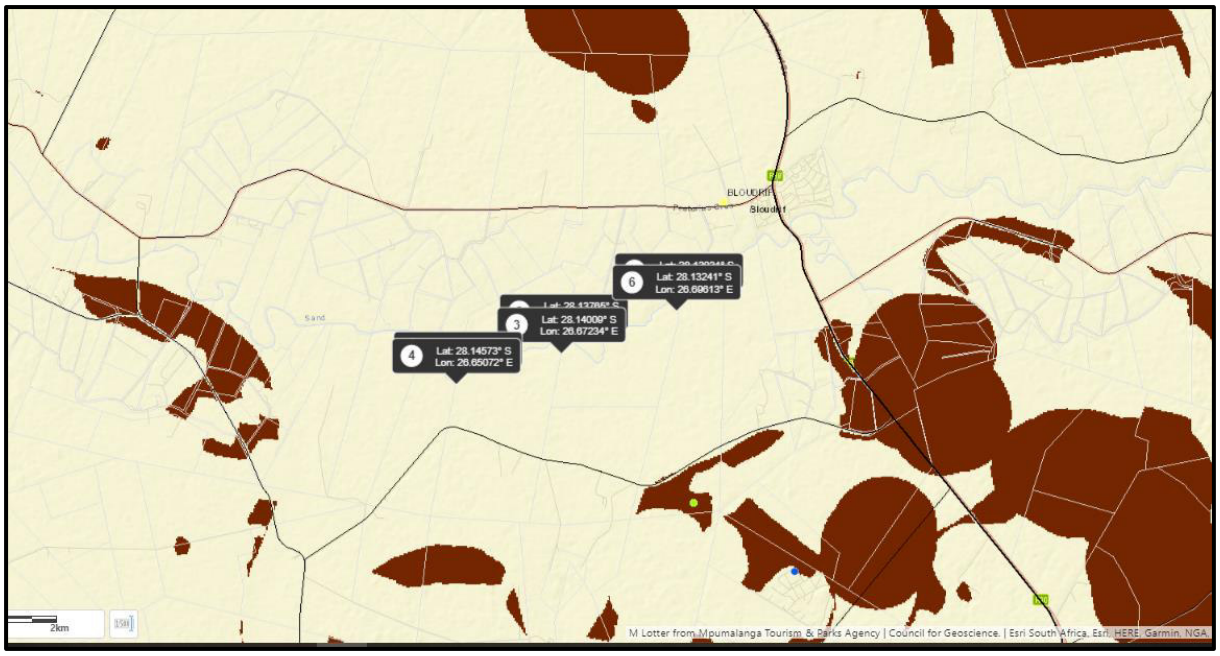


Figure 16: The Mining and Biodiversity importance map where the GPS labels indicate the proposed mining area. Dark brown – highest biodiversity importance. (Image obtained from the BGIS Map Viewer: Mining Guidelines)

BIODIVERSITY CONSERVATION AREAS

(Information extracted from the Wetland and Riparian Assessment, 2022 attached as Appendix G)

According to the 2015 Free State Biodiversity Plan (FSBP), the study area is situated within an area characterised as an Ecological Support Area 1 (ESA1) (refer to following figure). The Lexicon of Biodiversity Planning in South Africa provides the following definition for an ESA area:

- Ecological Support Area (ESA): *"An area that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a CBA or protected area, or to generate or deliver ecosystem services, or to meet remaining biodiversity targets for ecosystem types or species when it is not possible or not necessary to meet them in natural or near-natural areas."*

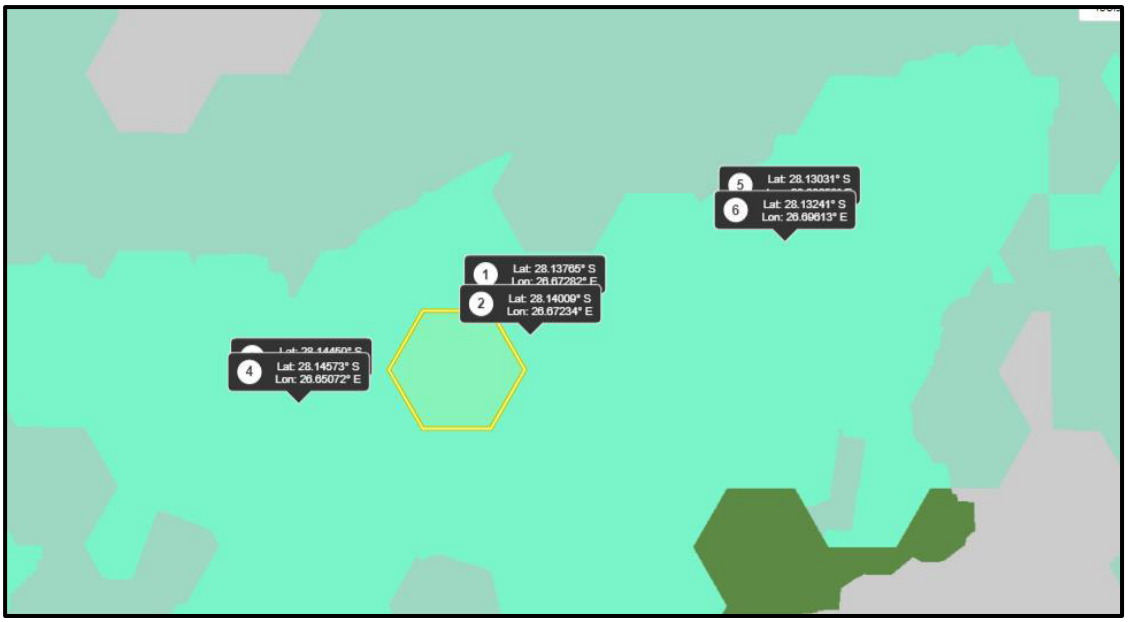


Figure 17: 2015 Free State Biodiversity Plan showing the footprint of the earmarked area (GPS tags), in relation to the ESA1 area (light blue). (Image obtained from the BGIS Map Viewer: 2015 Free State Biodiversity Plan).

VEGETATION

(Information extracted from the Wetland and Riparian Assessment, 2022 attached as Appendix G)

According to Mucina and Rutherford (2012) the vegetation type of the study area is classified as Highveld Alluvial Vegetation (Aza5) as presented in the following figure.

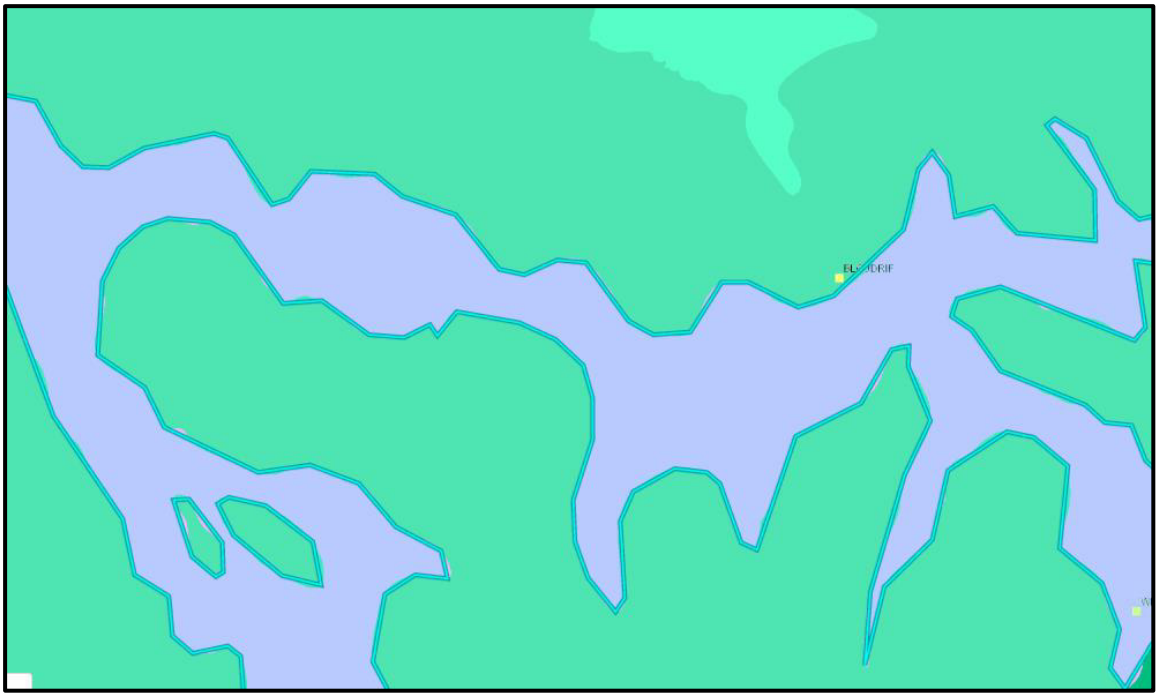


Figure 18: Map showing the distribution of the Highveld Alluvial Vegetation (Aza5) vegetation type (purple polygon) as depicted on the SANBI 2018 National Vegetation Map. (Image obtained from the BGIS Map Viewer: 2018 National Vegetation Map).

The Highveld Alluvial Vegetation (AZa5) vegetation type is characterised by flat topography supporting riparian thickets mostly dominated by *Vachellia karroo*, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants (Mucina & Rutherford, 2012). Important taxa include amongst others:

Vachellia karroo, *Salix mucronata* subsp. *mucronata, Ziziphus mucronata*, *Celtis africana*, *Sersia lancea, Gymnosporia buxifolia*, *Searsia pyroides*, *Diospyros lycioides*, *Ehretia rigida*, *Grewia flava, Asparagus laricinus*, *A. suaveolens*, *Phragmites australis, Gomphocarpus fruticosus*, *Felicia muricata*, *Agrostis lachnantha*, *Andropogon eucomus*, *Chloris virgata*, *Cynodon dactylon*, *Eragrostis plana*, *Persicaria lapathifolia*, *Alternanthera sessilis*, *Barleria macrostegia*, *Corchorus asplenifolius*, *Crinum bulbispermum*, *Haplocarpha lyrata*

The conservation status of the vegetation type is Least Concern (LC), with the conservation target set at 31%, of which nearly 10% is statutorily conserved in Nature Reserves such as Baberspan, Bloemhof Dam, Christiana, Sandveld, Soetdoring Nature Reserves etc.

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Hydrology, Geohydrology* and Groundcover (including Wetlands).

FAUNA

Fauna that may be present in the greater area, or visit the study area, comprises of birds such as doves, starlings, sparrows, and swallows as well as commonly found insects, reptiles, and small mammals. The landowners keep livestock, but to date no protected or red data faunal species were identified to be resident within the proposed mining footprint.

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Fauna*.

HUMAN ENVIRONMENT

CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Archaeological Impact Assessment for the Proposed De Klerkskraal Sand Quarry, Theunissen, Free State Province, January 2017 & Phase 1 Palaeontological Impact Assessment of a Proposed New Sand Quarry on the farm De Klerkskraal 231, Theunissen, Free State Province, January 2017)

In 2017, Heritage Contracts and Archaeological Consulting CC (HCAC) were appointed to conduct an Archaeological Impact Assessment (AIA) for the sand mine application submitted by Blazecor. No archaeological sites (Iron Age or Stone Age) of significance were recorded within the study area, and the report recommended that the development may proceed in terms of Section 35 of the NHRA, 1999. Further to this, Dr L Rossouw conducted a Phase 1 Palaeontological Impact Assessment (PIA) for the Blazecor sand mine application (2017). The specialist did not find any evidence for the accumulation and preservation of intact fossil material within the homogenous and geologically recent (Holocene – Recent) alluvial overburden (river sand) covering the footprint. The report noted that although the development will primarily affect the geologically recent alluvial overburden, the potential for disturbance or destruction of Quaternary palaeontological resources is considered negligible, but potentially high if mining activities are to be conducted outside the development footprint (4.8 ha) (Rossouw, 2017).

The South African Heritage Resources Agency (SAHRA) compiled the Palaeontological (fossil) Sensitivity Map (PSM) to guide developers, heritage officers and practitioners in screening palaeontologically sensitive areas at the onset of a project. When the footprint of the proposed mining area is placed on the PSM, it shows the study area to extend over areas of moderate (green) concern as presented in the figure below. Considering this, a palaeontological desktop study is required.

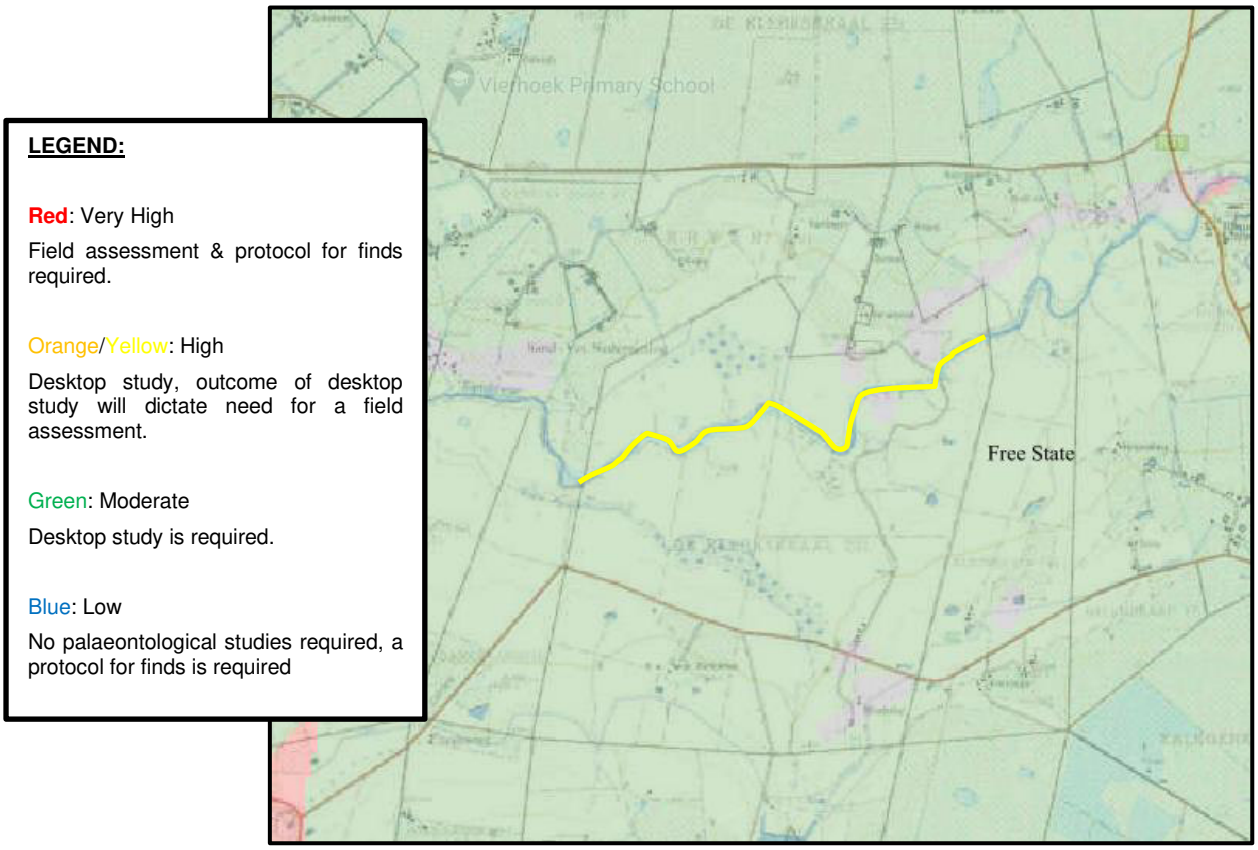


Figure 19: The SAHRA palaeontological sensitivity map shows that the proposed mining footprint (yellow line) extends over an area of medium concern (green) (image obtained from the PalaeoSensitivity Map on SAHRIS).

Subsequently, Beyond Heritage was appointed to investigate the cultural/heritage sensitivity of the study area as discussed in more detail under Part A (1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Cultural and Heritage Environment*.

SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Social and Labour Plan of the De Klerks Kraal Sand Mine)

Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 is situated within the Matjhabeng Local Municipality (MLM) that forms part of the Lejweleputswa District. The Matjhabeng municipality comprises of four towns, which are Welkom (the administrative head office), Virginia, Odendaalsrus and Allanridge. The following section provides a summarised look at the demographics of the municipal area.

Gender Profile:

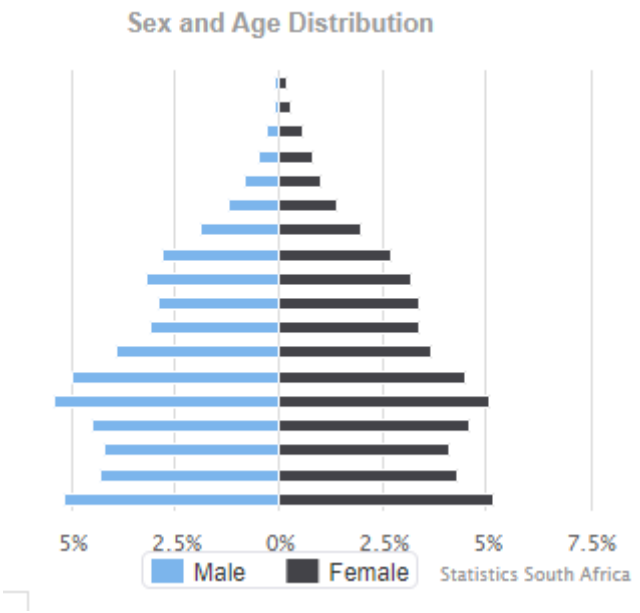


Figure 20: Gender profile of the MLM (image obtained from Statistics South Africa).

The figure above depicts the population of the MLM by age group and gender. It indicates that in 2011, there were the same number of males and females in age group 0-4 years. For age groups 15-19, 35-39, and 40-44 years, females had higher proportion in comparison to males. The population for both males and females' decline from age group 50-54.

Population Profile:

Group	Percentage
Black African	87,7%
Coloured	2,1%
Indian/Asian	0,4%
White	9,6%
Other	0,2%

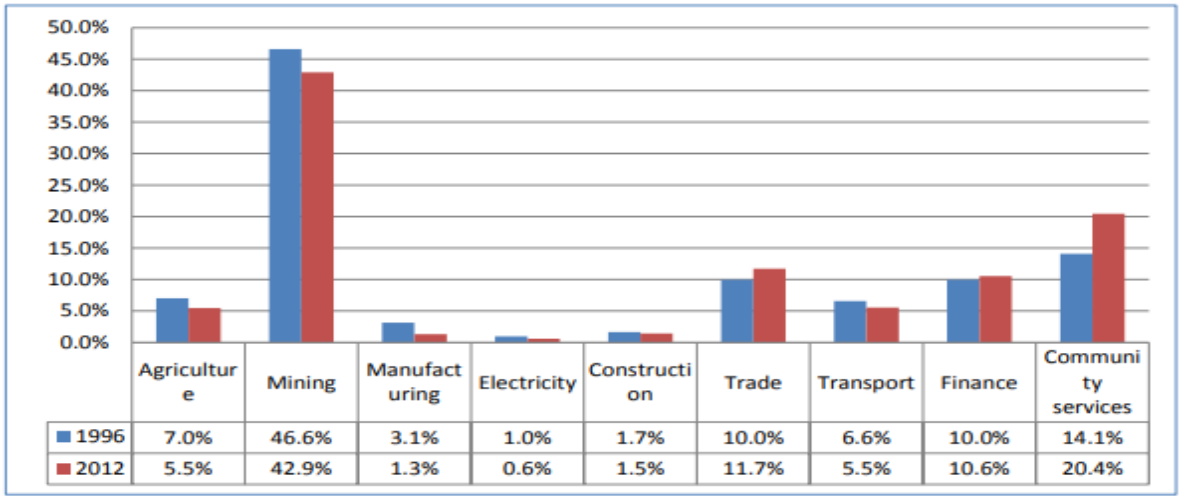
Figure 21: Population profile of the MLM (image obtained from Statistics South Africa).

According to Census 2011, as depicted in the figure above, the municipality has a total population of 406 461 people of which 87.7% were black African, 9.6% were white people and with the other population groups making up the remaining 2.7%. The population growth during the 2011 Survey were -0.04%. According to STATS SA,

during 2001 the Matjhabeng total population was 408 170, which went slightly down to 406 461 in 2011.

Economic Profile:

The GDP Contribution by industry in the Lejweleputswa District Municipality is set out more fully in the figure below:



	Agriculture	Mining	Manufacturing	Electricity	Construction	Trade	Transport	Finance	Community services
1996	7.0%	46.6%	3.1%	1.0%	1.7%	10.0%	6.6%	10.0%	14.1%
2012	5.5%	42.9%	1.3%	0.6%	1.5%	11.7%	5.5%	10.6%	20.4%

Figure 22: GDP contribution by industry (image obtained from Statistics South Africa).

As is clear from the above, the predominant contributor in the district municipality is mining, followed by community services and trade.

2014	Lejweleputswa	Masilonyana	Tokologo	Tswelopele	Matjhabeng	Nala	
1 Agriculture	5.6%	6.2%	24.6%	36.9%	0.8%	17.7%	
2 Mining	46.5%	50.3%	21.6%	1.2%	56.0%	4.7%	
3 Manufacturing	**2.5%**	**2.1%**	**2.9%**	**2.2%**	**2.1%**	**5.2%**	
4 Electricity	1.5%	1.2%	2.9%	2.8%	1.3%	2.3%	
5 Construction	1.7%	2.2%	2.5%	1.8%	1.5%	2.6%	
6 Trade	11.0%	8.3%	12.3%	15.4%	10.0%	17.6%	
7 Transport	**6.3%**	**5.2%**	**5.0%**	**7.8%**	**5.6%**	**11.8%**	
8 Finance	10.8%	8.4%	7.6%	10.6%	10.8%	13.9%	
9 Community services	14.2%	16.2%	20.7%	21.4%	11.9%	24.0%	
Total Industries	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Figure 23: Sectoral composition of Lejweleputswa's economy by local municipality, 2014 (HIS Global Insight Regional eXplorer, 2015)

The five predominant economic contributors in the Matjhabeng local municipality during 2014 was mining at 56%, Community services at 11.9%, Finance at 10.8%,

Trade at 10% and Transport at 5.6%. In recent years the contribution of mining in Lejweleputswa's economy has been declining due to several reasons and recently the effect of lower world commodity prices has fuelled the decline of the sector. The share of the primary sector in Lejweleputswa's GVA has also been on a decline, indicating a shift away from the primary sector to the tertiary sector. The community services sector is growing strongly in all of Lejweleputswa's municipalities and is also forecasted to grow further.

Employment profile:

There are 158 174 economically active (employed or unemployed but looking for work) people, and of these 37% are unemployed. The youth unemployment rate is 49.7% for the area.

The majority household income is between R 19 601 to R 38 200 at 18.2%, followed by 17.4% at R 9 601 to R 19 600 and 16.3% of the population has no income. The minority of the economically active population falls within the higher income bracket, with 0.7% earning between R 614 001 to R 1 228 800, and only 0.2% earning between R 1 228 801 and above.

(b) Description of the current land uses

Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 is situated in a rural setting surrounded by other farming properties. The study area is approximately 35 km north of the town of Theunissen and ±25 km south of Welkom. The farms are mainly used for grazing, while Blazecor obtained a sand mining permit for 4.8 ha over Portion 0 of De Klerks Kraal No 231. The Sand River flows through both properties.

The following table provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the study area:

Table 9: Land uses and/or prominent features that occur within 500 m radius of the study area.

LAND USE CHARACTER	YES	NO	DESCRIPTION
Natural area	**YES**	-	The proposed footprint is surrounded by natural areas used for agricultural purposes.
Low density residential	-	**NO**	-
Medium density residential	-	**NO**	-
High density residential	-	**NO**	-
Informal residential	-	**NO**	-
Retail commercial & warehousing	-	**NO**	-

LAND USE CHARACTER	YES	NO	DESCRIPTION
Light industrial	-	**NO**	-
Medium industrial	-	**NO**	-
Heavy industrial	-	**NO**	-
Power station	-	**NO**	-
High voltage power line	-	**NO**	-
Office/consulting room	-	**NO**	-
Military or police base / station / compound	-	**NO**	-
Spoil heap or slimes dam	-	**NO**	-
Quarry, sand or borrow pit	**YES**	-	The proposed MR footprint extends across the 4.8 ha Blazecor mining permit area.
Dam or reservoir	**YES**	-	Various farm dams are within 500 m of the footprint area.
Hospital/medical centre	-	**NO**	-
School/ crèche	-	**NO**	-
Tertiary education facility	-	**NO**	-
Church	-	**NO**	-
Old age home	-	**NO**	-
Sewage treatment plant	-	**NO**	-
Train station or shunting yard	-	**NO**	-
Railway line	-	**NO**	-
Major road (4 lanes or more)	-	**NO**	-
Airport	-	**NO**	-
Harbour	-	**NO**	-
Sport facilities	-	**NO**	-
Golf course	-	**NO**	-
Polo fields	-	**NO**	-
Filling station	-	**NO**	-
Landfill or waste treatment site	-	**NO**	-
Plantation	-	**NO**	-
Agriculture	**YES**	-	The earmarked properties are used for agricultural purposes.
River, stream, or wetland	**YES**	-	This application includes the mining of sand from the riverbed of the Sand River.
Nature conservation area	-	**NO**	-
Mountain, hill, or ridge	-	**NO**	-
Museum	-	**NO**	-
Historical building	-	**NO**	-
Protected Area	-	**NO**	-
Graveyard	**-**	**NO**	-
Archaeological site	-	**NO**	-
Other land uses (describe)	-	**NO**	-

(c) Description of specific environmental features and infrastructure on the site.

SITE SPECIFIC TOPOGRAPHY

(Information extracted from the Wetland and Riparian Assessment, 2022 attached as Appendix G)

According to the WRA, the topography is closely associated with the Sand River and its functioning. The surrounding topography outside the application area is dominated by alluvial plains which also forms part of the historical floodplain of the river. These plains also have a gradual and gentle slope toward the river. Within this alluvial floodplain, being dominated by fine, silt sediments, several drainage lines and stream systems have become incised into the terrain and form prominent watercourses in the study area. The banks of the river consist of an elevated upper zone, dominated by riparian thicket with a gentle slope, which then transitions into the steep sloped lower zone (the banks of the river). The lower zone again levels off into the marginal zone along the main channel of the river. Altitude varies from 1 300 m to 1 275 m and should illustrate the gradual slope from the surrounding alluvial plain areas toward the river.

The proposed activity will impact the topography of the earmarked footprint in that the virgin soil level of the floodplain/riparian area will be reduced as simulated in Figure 5. The depth of the mining activities will be limited to ±300 mm above the groundwater table. However, should the mitigation measures proposed in this report be implemented it is believed that the impact thereof will be of moderate significance upon rehabilitation of each mined area.

Also refer to Part B(1)(d)(i) *Determination of closure objectives* as well as the Closure Plan attached as Appendix N.

SITE SPECIFIC VISUAL CHARACTERISTICS

Due to the topography of the area, the proposed footprint will mainly be visible from immediate surrounding areas. The figure below shows the viewshed analysis for the proposed footprint within a ±10 km radius. The green shaded areas show the positions from where the mining area will be visible. From this analysis it is shown that the visual impact of the earmarked footprint will be of medium significance without mitigation. The small scale of the proposed operation (±6.5 ha affected at a time if both minor area is operational), and the proposed progressive rehabilitation, will however assist in mitigating the visual impact of the proposed development on the surrounding environment. No residual visual impact is expected upon closure of the mine.

Figure 24: Viewshed analysis of the proposed footprint where the green shaded areas show the positions from where the mine will be visible (within 10 km radius) (image obtained from Google Earth).

SITE SPECIFIC AIR QUALITY AND NOISE AMBIANCE

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed operation will not trigger an application in terms of the said act. Emissions to be generated at the mine will mainly consist of occasional dust due to the displacement of soil, screening, and transport of the sand from the farm.

The figure below shows the position of the nearest residences to the proposed mining area:

- Number 1 – 2 Farmyard & leisure residential development: ±55 - 350 m.
- Number 3: ±700 m
- Number 4: ±615 m
- Number 5: ±1,1 km
- Number 6: ±2.6 km
- Number 7: ±2.3 km

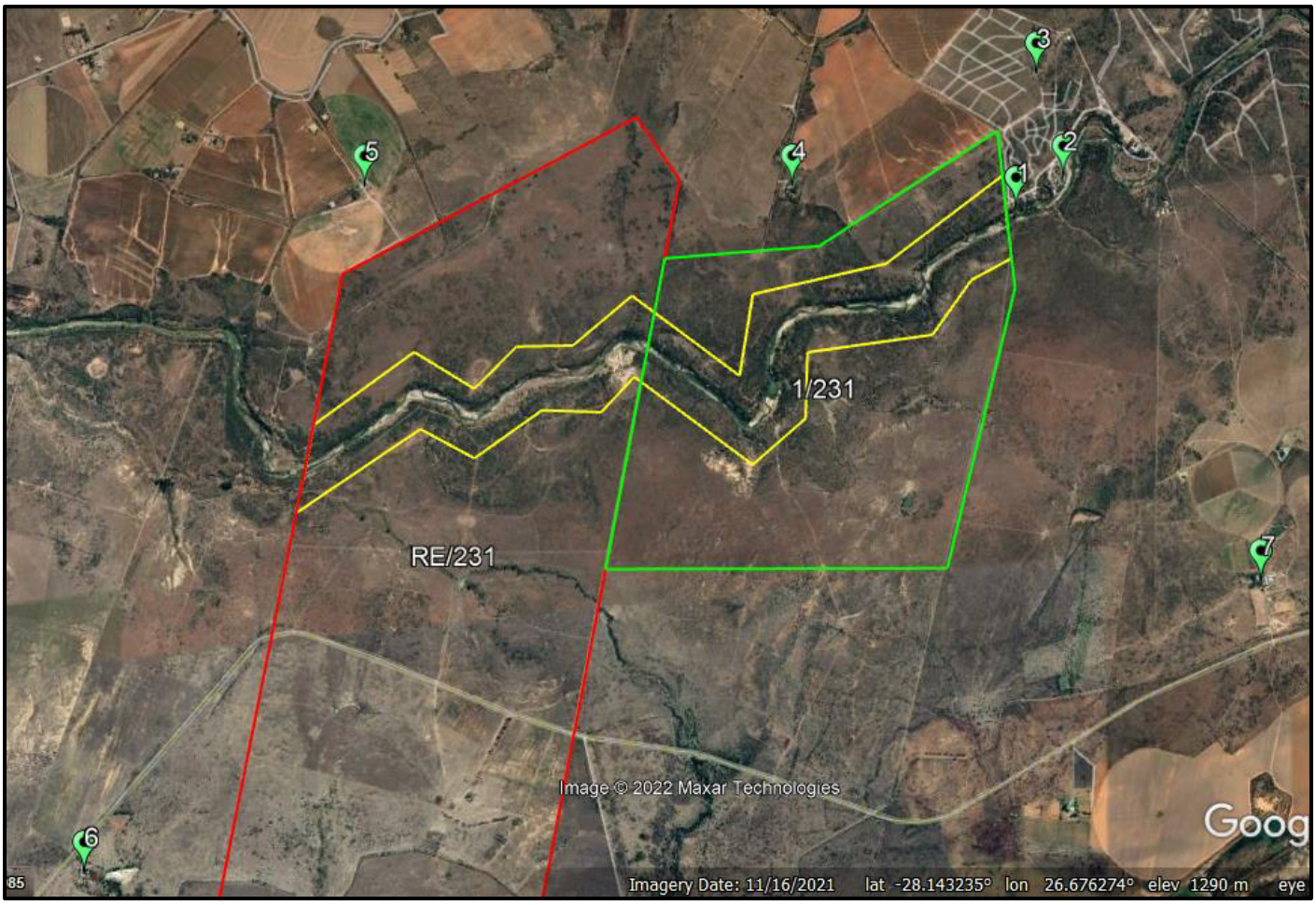


Figure 25: Satellite view showing the position of the nearest residences to the proposed mining area (yellow polygon) where the green and red polygons indicate the farm boundaries. (Image obtained from Google Earth)

Large stockpile areas act as dust generating sources especially during windy conditions. Site management intends to keep the stockpile area to the smallest possible footprint to reduce this impact. Site management will further implement the use of a permanent water truck/s to moisten the denuded areas during dry periods/windy spells.

Also refer to Part A(1)(g)(viii) *The possible mitigation measures that could be applied and the level of risk – Air Quality and Noise Ambiance*.

Noise Quality:

As with air quality, the current activities on the property and surrounding environment already impact the noise ambiance of the study area. Should the mining right be approved, it is expected that the mining operation will generate approximately the same noise levels as the current sand mining operation caused by the processing of the sand, as well as the loading, and transporting of material. Due to the small scale

of the operation the noise levels to be generated at the mine is deemed to be of low significance to the surrounding environment.

Also refer to Part A(1)(g)(viii) *The possible mitigation measures that could be applied and the level of risk – Air Quality and Noise Ambiance*.

SITE SPECIFIC HYDROLOGY, GEOHYDROLOGY AND GROUNDCOVER (INCLUDING WETLANDS)

(Information extracted from the Wetland and Riparian Assessment, 2022 attached as Appendix G, as well as the Aquatic Assessment attached as Appendix H)

1. WETLAND ASSESSMENT

1.1 Ecology and Description of the Study Area

The main channel, banks, and floodplain of the Sand River, which forms the main study area for the proposed mining, is largely still intact and natural. The existing sand mine of ±5 ha is presently the only significant impact in the area. This mining area has mostly resulted in the removal of riparian vegetation, modification of the riverbanks and transformation of the geomorphology. The floodplain or riparian zone of the river is extensive along the entire section of the study area. The riparian zone is dominated by thicket with fine alluvial sediments, also confirming the extent of this zone. It is doubtful if flooding will still be able to extend along the entire breadth of the riparian zone, mostly because of the upstream Allemanskraal Dam which acts as a flood regulator. This is also considered to have a significant impact on the natural functioning of the flooding regime of the river.

The study area is being utilised as grazing for domestic livestock which leads to a moderate level of overgrazing and trampling but is not regarded as having a large impact on the riparian vegetation and river itself. A few small dirt tracks transect the area but are few and small and do not have any significant impact. The study area is therefore still largely intact and affected by only a few impacts, the current sand mining area being the most significant.

The vegetation structure along the banks of the river varies considerably, mostly because of the variety of habitats and diverse geomorphology along the riverbanks. The surrounding riparian zone is dominated by a fairly dense riparian thicket with interspersed herblands and grassland. Along the upper zone or bank of the river, a dense riparian thicket dominated by tall trees are prominent. Vegetation along the lower and marginal zones of the riverbank is subjected to annual flooding and is

therefore dominated by a variety of hygrophilous grasses, herbaceous plants, sedges and reeds. Exotic weeds are also abundant along these portions of the riverbank.

As mentioned earlier, the surface water runoff in the area is not significantly high. As a result, wetlands are uncommon in the area although several wetland areas are associated with the floodplain of the Sand River and the drainage lines and seasonal streams transecting the floodplain of the river.

Pioneer weeds and exotics are abundant in the study area, especially along the banks of the river. The river is subjected to a natural disturbance regime because of annual flooding. As a result, this promotes the establishment of these exotic weeds along the banks of the river.

Figure 26: Surrounding terrestrial areas are dominated by a well-developed grassland which transitions into a much more denser thicket vegetation within the floodplain or lower laying alluvial plains associated with the river (image obtained from the Wetland and Riparian Assessment).

Figure 27: The alluvial plain associated with the floodplain of the river, is dominated by a dense thicket vegetation structure (image obtained from the Wetland and Riparian Assessment).

Figure 28: Along the riparian zone of the river a few distinct floodplain wetlands have formed (image obtained from the Wetland and Riparian Assessment).

1.2 Wetland and Watercourse Assessment

Although the study area consists mainly of the Sand River and its banks, the Wetland and Riparian Assessment (Appendix G) included the delineation of wetland areas associated with the river, such as floodplain wetland backwaters, delineation of the riparian zone or floodplain situated within the proposed study area or mining right application area as well as an overview of lateral streams and drainage lines flowing into the river, in order to provide an accurate assessment of the study area and the affected section of the Sand River.

The term watercourse refers to a river, stream, wetland or pan. The National Water Act (NWA, 1998) includes rivers, streams, pans, and wetlands in the definition of the term watercourse. The Sand River has been listed as a third order watercourse and therefore forms a large lowland river system. Riparian habitat is an accepted indicator of watercourses used to delineate the extent of wetlands, rivers, streams, and pans (Department of Water Affairs and Forestry 2005).

Obligate wetland vegetation was utilised to determine the presence and border of wetland conditions along the banks of the river, as well as within its floodplain, lateral stream systems and any wetland areas situated within the floodplain. Soil samples were investigated for the presence of anaerobic evidence which characterises wetland soils. Soil samples reliably indicated that wetland conditions along the Sand River at the site is confined to the marginal and lower zones with perennial zones of wetness being present at the water's edge and the marginal zone, decreasing into a seasonal zone of wetness in the lower zone and with wetland conditions being absent from the upper zone of the river. This was also clearly reflected within the vegetation composition along the banks.

The riparian zone of the river extending along both the northern and southern floodplain of the river is quite extensive. The vegetation type here, Highveld Alluvial Vegetation, also confirm the deposition of silty soils through the historical flooding of the river. Though flooding may not necessarily extend over the riparian zone it does still contain the characteristics of a floodplain and is therefore still regarded as forming part of the riparian zone of the river. The soils within this riparian zone contain fine silty soils (a consequence of historical flood deposition) but it was devoid of wetland conditions. The soil samples indicated fine silty soils with a high sand content and vegetation was dominated by riparian thicket and confirmed that the floodplain forms part of the riparian zone of the river and although flooding will occur only very infrequently it is inevitable that flooding will occur at some time. Furthermore, a few backwater floodplain wetlands also occur within the riparian zone. These are visible as shallow depressions, forming backwater systems and in all these areas both soils and vegetation indicated at least seasonal wetland conditions.

Soil samples taken within several of the lateral drainage lines or seasonal streams indicated the clear presence of wetland conditions, at least for those portions of the streams situated within the proposed mining area. It is clear that these systems discharge annually from runoff generated in the surrounding catchment but is also being inundated when floods within the Sand River push up into the lateral streams. The soil samples also confirm that soil saturation and the period of inundation is sufficient to create wetland conditions. These wetland conditions are however confined to the main channel of these watercourses with their banks consisting of riparian vegetation and forming part of the riparian zone.

These wetland soil indicators were also confirmed in all these areas by the presence of obligate wetland species. Obligate wetland species are confined to wetlands and cannot occur in conditions outside of these systems. As a result, where they occur, wetland conditions can be considered to occur. Riparian vegetation was also utilised to delineate the riparian zones along the river.

1.3 Classification of Wetland Systems

The wetland conditions identified by the specialist along the banks of the Sand River as well as the lateral drainage lines and streams flowing into it can be classified into a specific wetland type known as a channel wetland system. Defined as: ““*An open conduit with clearly defined margins that (i) continuously or periodically contains flowing water, or (ii) forms a connecting link between two water bodies. Dominant water sources include concentrated surface flow from upstream channels and tributaries,*

diffuse surface flow or interflow, and/or groundwater flow. Water moves through the system as concentrated flow and usually exits as such but can exit as diffuse surface flow because of a sudden change in gradient. Unidirectional channel-contained horizontal flow characterises the hydrodynamic nature of these units. Note that, for purposes of the classification system, channels generally refer to rivers or streams (including those that have been canalised) that are subject to concentrated flow on a continuous basis or periodically during flooding, as opposed to being characterised by diffuse flow. As a result of the erosive forces associated with concentrated flow, channels characteristically have relatively obvious active channel banks. An active channel is a channel that is inundated at sufficiently regular intervals to maintain channel form and keep the channel free of established terrestrial vegetation. These channels are typically filled to capacity during bankfull discharge (i.e., during the annual flood, except for intermittent rivers that do not flood annually)." (SANBI 2009).

The wetland conditions are confined to the main channel of these systems which experience surface flow either seasonally or perennially. Here wetland conditions are most prominent along the main channel and decrease in distance from the channel. Where wetland conditions occur in the floodplain of the Sand River, small backwater depressions have formed, and these wetland conditions can be regarded as forming a floodplain wetland. Defined as: ""*A floodplain wetland and lowland river floodplain: the mostly flat or gently sloping wetland area adjacent to and formed by a lowland floodplain river and subject to periodic inundation by overtopping of the channel bank of the river. The location of the wetland adjacent to the river in the lowland floodplain zone is the key criterion for distinguishing a floodplain wetland from a channelled valley-bottom wetland. Water and sediment input to floodplain wetland areas is mainly via overtopping of a major channel, although there could be some overland or subsurface flow from adjacent valley side-slopes (if present). Water movement through the wetland is dominantly horizontal and bidirectional, in the form of diffuse surface flow and interflow, although there can be significant temporary containment of water in depressional areas (within which water movement is dominantly vertical and bidirectional). Water generally exits as diffuse surface flow and/or interflow, but infiltration and evaporation of water from a floodplain wetland can also be significant, particularly if there are a number of depressional areas within the wetland*." (SANBI 2009).

1.4 Description of Watercourses

The proposed mining operations will mostly affect the banks of the Sand River and the adjacent floodplain or riparian zone. The description of the affected section of the river will be divided into 1. the main channel and banks, 2. the floodplain or riparian zone (including backwater wetland areas) and 3. the lateral watercourses flowing into it. Obligate wetland vegetation was also used to determine the presence of wetland conditions.

1.4.1 Sand River Main Channel and Banks

River systems can be divided into different riparian zones within the lateral section of the system. These riparian zones represent the banks of a river and can be distinguished in terms of their geomorphology and vegetation structure. The identified zones applicable to the Sand River in the study area are as follows:

- **Marginal Zone**: The lowest zone always presents in river systems. The zone is situated from the water level at low flow, if present, up to the features that are hydrologically activated for most of the year.

  The marginal zone within the Sand River as it occurs within the study area is well defined and easily identifiable. It is relatively narrow in most areas, varying between 1 to 5 meters and is inundated annually during flooding. Along the majority of the affected river section the marginal zone is only one meter in width, however, this may increase to about 5 meters in areas where lateral streams flow into the river and form alluvial sediment fans along the riverbank. Previous studies (2017) in the area indicates a dense riparian and sedge layer. However, due to recent prolonged flooding and inundation, most of the vegetation in the marginal zone has either been removed, buried by sediment deposition, or succumbed after being submerged for a long period. This also provides an indication of the way the riparian vegetation in this zone functions, it is adapted to a disturbance regime whereby periodic large floods cause disturbance and removal of the vegetation and where after the vegetation will undergo a period of succession until the next large flood causes removal of the vegetation. Almost the entire marginal zone is considered a perennial zone of wetness, indicating that soil saturation occurs throughout the year because of the zone being situated at the water's edge. Most of this zone seems to be largely natural on both the southern and northern banks.

As indicated, most of the vegetation within the marginal zone has been removed by recent flooding. The scant vegetation that has been able to survive include the semi-aquatic fern *Equisetum ramosissimum*, the hygrophilous grass, *Paspalum distichum*, the wetland sedges, *Cyperus marginatus* and *Cyperus longus* and the common reed, *Phragmites australis*. It was also notable that the riparian tree, *Salix mucronata*, was able to the withstand the flooding of the marginal zone, one of the few trees able to do this. When this survey was compared to previous surveys (2017) the species composition was found to much the same although the abundance was much lower, having been decreased by flooding and inundation. The abundance of the wetland plants will now steadily increase again over the following seasons. It was however notable that exotic weeds observed previously were now completely absent. These establish as a response to flooding but are not in any way adapted to inundation and are quickly removed during floods. They will however undoubtedly re-establish in time.

Figure 29: The marginal zone (red) is quite narrow. Note that recent flooding has almost completely removed the riparian vegetation in this zone (image obtained from the Wetland and Riparian Assessment).

Figure 30: Another view of the marginal zone (red). This is the shape it has for most of this river section, only broadening significantly where alluvial fans occur (image obtained from the Wetland and Riparian Assessment).

- **Lower Zone**: Characterised by seasonal features and extends from the marginal zone up to an area of marked elevation. This area may be accompanied by a change in species distribution patterns. The lower zone consists of geomorphic features that are activated on a seasonal basis.

  The lower zone along the Sand River can also be clearly defined and is easily visible as a definite and steep increase in slope over a short distance where after it levels off into the upper zone. The lower zone is inundated less frequently and only during larger flooding events as has recently occurred at the site. In small sections of the river, especially where lateral streams flow into the river and an alluvial fan occurs and the marginal zone is broader the lower zone extends over a larger distance and the increase in slope and elevation is more gradual. It is also clearly defined by a grass layer but with many obligate wetland plants as well. This can also be explained by the flooding of the lower zone. The marginal and lower zones contain almost no trees whereas the upper zone is dominated by trees. The lower zone is largely natural within the study area but is affected by the current sand mining area.

  The current survey indicated that vegetation loss due to the recent flood was much less within the lower zone. However, when compared with previous surveys in this area it is notable that the percentage vegetation cover was much higher prior to flooding. Vegetation establishment will continue over time until it is again as dense as prior to the flood. The zone contains a higher species diversity than the marginal

zone but with several grass species still being dominant. Dominant grasses include *Cynodon dactylon, Panicum coloratum, Digitaria eriantha, Setaria sphacelata, Setaria pallide-fusca, Eragrostis lehmanniana* and *Sporobolus fimbriatus*. This is a mixture of terrestrial grasses and facultative wetland species and indicates a decrease in the moisture regime and wetland condition from the water's edge up the banks of the river. However, obligate wetland sedges and other growth forms are also still abundant and confirms that wetland conditions remain present in the lower zone. These include sedges such as Cyp*erus fastigiatus, Cyperus marginatus* and *Cyperus longus*. As with the marginal zone, the lower zone is also subjected to frequent flooding and the consequent disturbance caused by this. As a result, exotic weeds are also abundant in this zone and include *Xanthium strumarium, Verbena bonariensis, Conyza bonariensis, Opuntia lindheimerii, Sesbania punicea, Cenchrus incertus* and *Tamarix ramosissima*. Where the lower zone contains extensive sandy areas, clumps of the indigenous tree, *Salix mucronata*, was also observed. As previously indicated, the lower zone is completely devoid of trees and shrub, except for this small tree. It has adapted to flooding and prolonged submergence and the survey has also confirmed that these have been able to survive the recent flooding. Scattered specimens of the protected geophyte, *Crinum bulbispermum*, also occur along the banks in the lower zone. This species still retains a significant conservation value and should be avoided by the proposed mining operations.

Figure 31: The lower zone (red) of the riverbank has a steep slope, is easily discernible and has a clear border with the upper zone (edge of riparian thicket). Also note a considerable loss of riparian vegetation due to recent flooding (image obtained from the Wetland and Riparian Assessment).

Figure 32: The lower zone (red) varies in width along the section and may be narrow on one bank, while being broad on the opposite bank (image obtained from the Wetland and Riparian Assessment).

- **Upper Zone:** Characterised by ephemeral features as well as the presence of both riparian and terrestrial species. The zone extends from the lower zone to the riparian corridor. The upper zone contains geomorphic features that are hydrologically activated on an ephemeral basis.

  The upper zone along the Sand River is clearly visible as a decrease in slope and an increase in the woodland component. The tree species can attain height and age due to the deep root systems still able to access the higher moisture levels and as flood disturbance in the upper zone is much less the trees are allowed to grow old without being removed by flood damage. The riparian tree species within the upper zone is dominated by *Vachellia karroo* (Sweetthorn), *Ziziphus mucronata* (Buffalo Thorn), *Searsia pyroides* (Taaibos), *Celtis africana* (White Stinkwood) and *Diospyros lycioides* (Bluebush) which then also indicate the border of the upper zone. Underneath this tree layer an undergrowth is present which is adapted to shaded habitats formed by the tree layer. The shade loving grass, *Setaria verticillata* is especially abundant. Shrubs include *Lycium hirsutum*, *Artemisia afra, Asparagus cooperi* and *Asparagus larcinus*. Though disturbance caused by flooding is much less in this zone, other disturbances are still present and is substantiated by the presence of several exotic weeds and invasive species. These include the weeds, *Bidens bipinnata, Tagetes minuta, Achyranthes aspera* and the invasive tree species, *Eucalyptus camaldulensis, Populus deltoides* and *Fraxinus americana*. Most of the upper zone, and the riparian thicket it supports, is still intact.

Figure 33: The border between the upper- and lower zones (red) is easily visible where the slope levels off and the riparian thicket starts (image obtained from the Wetland and Riparian Assessment).

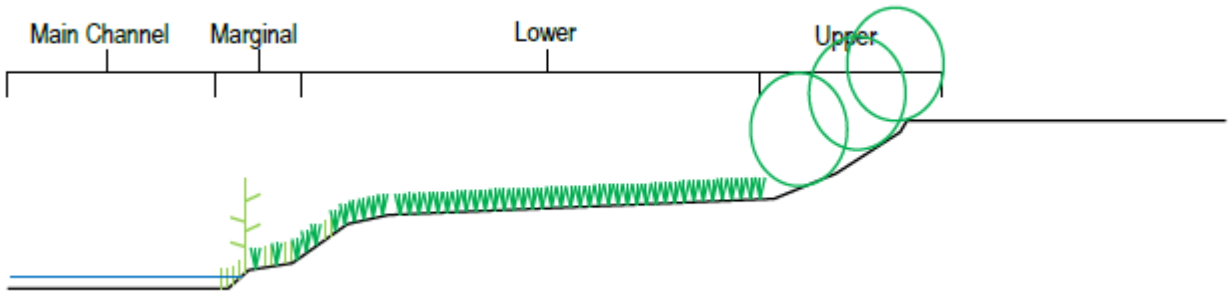


Figure 34: Illustration showing the different riparian zones of the Sand River in the study area. This illustrates the broadening of the zones in areas where alluvial fans occur. These are also the portions most likely to be targeted for sand excavation (image obtained from the Wetland and Riparian Assessment).

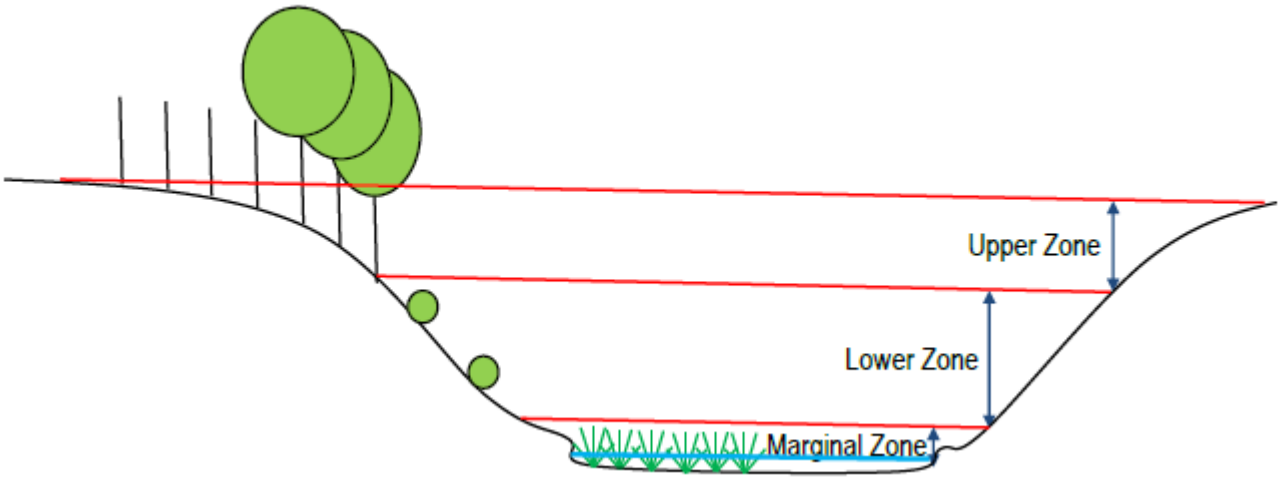


Figure 35: Illustration showing the different riparian zones of the of Sand River in the study area. This illustrates the steep banks occurring in some portion of the river, especially along the northern banks. Note the narrow marginal zone and steep lower zone (image obtained from the Wetland and Riparian Assessment).

1.4.2 Floodplain and Riparian Zone of the Sand River:

The floodplain or riparian zone of the Sand River along the section in the study area is extensive. It is very broad in most areas and covers the entire extent of the proposed mining areas, i.e., 200 meters in width on both the northern and southern banks.

Delineation of the floodplain or riparian zone could not be easily determined since alluvial deposition has occurred over an extensive area. It is however certain that almost the entire mining area consists of the riparian zone with only a few small portions clearly consisting of surrounding terrestrial habitats. The delineation of the floodplain and edge of the riparian zone within the proposed mining area was determined by using a combination of soil sampling, vegetation composition and topography and is considered to give an accurate description of it.

Soil samples taken within the floodplain indicate the general absence of wetland conditions, which is also confirmed by the vegetation composition. The soils indicate a high silt content without any prominent gravel or stone component, which is characteristic of floodplains and confirms the presence of the riparian zone. A high sand content was also present in most areas.

Topography with the floodplain or riparian zone is dominated by a relatively flat, alluvial plain which extends over a larger area and is readily distinguished from the surrounding terrestrial areas which is visible as a slight elevation.

Soil samples and topography aid in delineation of the riparian zone, however, the vegetation composition is the most prominent indicator and provides the most accurate delineation of the riparian zone. The floodplain or riparian zone is dominated by a low shrub layer, scattered trees, and well-developed riparian thicket. The dense shrub/tree layer is dominated by Vach*ellia karroo, Lycium hirsutum, Asparagus larcinus, Ziziphus mucronata* and *Gymnopsoria buxiifolia*. This assemblage of tree and shrubs are quite characteristic of riparian thicket vegetation. A poorly developed grass layer, dominated by pioneer species is also interspersed in this shrub layer. These include *Aristida congesta, Eragrostis lehmanniana, Cynodon dactylon, Pogonarthria squarrosa* and *Urochloa mosambicensis*. The facultative grass, *Panicum coloratum*, also occur in areas of higher moisture regime. The fine silty soil in the riparian zone also promotes the establishment of a few succulent species such as M*estoklema tuberosum* and *Delosperma cooperi*. Exotic weeds are also common and include *Zinnia peruviana, Bidens bipinnata, Schkuhria pinata, Opuntia humifusa, Conyza bonariensis* and *Cyllindropuntia imbricata*.

Figure 36: The alluvial floodplain or riparian zone along the Sand River is relatively distinct as a flat plain dominated by riparian thicket (image obtained from the Wetland and Riparian Assessment).

Figure 37: Surrounding terrestrial areas are dominated by a well-developed grassland which transitions into a much more denser thicket vegetation within the floodplain or lower laying alluvial plans associated with the river (image obtained from the Wetland and Riparian Assessment).

Backwater Areas Forming Floodplain Wetlands:

As indicated the floodplain or riparian zone of the Sand River is largely devoid of wetland conditions. However, a few backwater wetland areas have formed and here wetland conditions are clearly present.

These floodplain wetlands are fairly easily distinguishable from the surrounding riparian thicket. All these areas form a very shallow depression where, consequently, surface water now accumulates and saturated soil conditions form. These floodplain wetlands are now mostly fed by runoff from the surrounding catchment, but it is most likely that they would also have been fed by overtopping of the main channel into the floodplain prior to the construction of the upstream Allemanskraal Dam. This dam acts as a flood regulator and the floodplain of the river would now be flooded on a very infrequent basis, if ever.

The topography of these wetland areas, a shallow depression, does allow for quite easy delineation of these wetland areas. Furthermore, soil samples contained quite clear indications of seasonal wetland conditions and further aided in the identification and delineation of these floodplain wetlands.

As indicated, these floodplain wetland areas are fairly easily discernible, and this is also the case for the vegetation within these areas. Where the surrounding floodplain is dominated by riparian thicket, these backwater wetland areas are dominated by hygrophilous grasses and obligate wetland sedges. This further aids in distinguishing these wetland areas. Hygrophilous grasses include the facultative species such as *Setaria sphacelatum, Echinichloa holubii* and *Pancium coloratum*. Obligate wetland sedges also dominated and include *Cyperus longus, Cyperus difformis* and *Cyperus marginatus*. Other herbaceous and graminoid plants which are abundant and are most often associated with areas with a high moisture regime include *Alternanthera sessilis, Cyperus indecorus, Isolepis* sp. and *Salola rabienana*. These backwater wetlands are all still natural but does also contain several exotic weeds such as *Verbena bonariensis, Xanthium strumarium* and *Schkuhria pinata*.

Table 10: Summary of backwater floodplain wetlands (table obtained from the Wetland and Riparian Assessment).

Watercourse	Position of crossing
#1 Western floodplain wetland	S 28.142277°, E 26.657987°
#2 North western floodplain wetland	S 28.139611°, E 26.661827°
#3 Eastern poorly defined floodplain wetland	S 28.137296°, E 26.684077°
#4 Eastern poorly defined floodplain wetland	S 28.136626°, E 26.691238°
#5 Eastern floodplain wetland	S 28.132651°, E 26.694400°

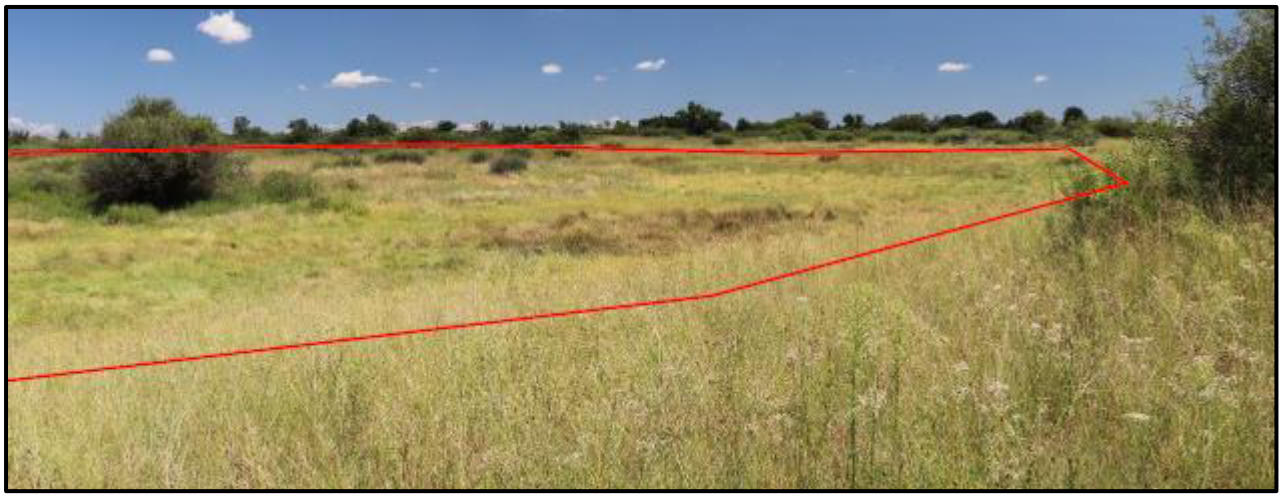


Figure 38: View of the backwater floodplain wetland area which clearly forms a shallow depression in the landscape (image obtained from the Wetland and Riparian Assessment).

1.4.3 Lateral Streams and Drainage Lines flowing into the Sand River:

As previously indicated, there are numerous small drainage lines and seasonal streams that drain from the terrestrial surroundings, across the floodplain and into the Sand River on the site. All of these, irrespective of their size, will transport surface water after rainfall events and they should therefore also be taken into consideration in this assessment.

The small lateral watercourses should be considered as sensitive systems, should be avoided by any proposed mining operations and an applicable buffer zone retained around these streams.

Soil samples taken within these small watercourses indicated that they all contain significant wetland conditions, at least in those portions of the watercourses that occur within the proposed mining area. They form clearly defined channel wetland systems, the same as the Sand River. Vegetation along these lateral watercourses also confirmed riparian conditions along all of them, while the main channel also contained at least some obligate wetland vegetation.

These watercourses flowing through the floodplain and into the Sand River all contain a well-defined main channel and is dominated by a riparian shrub layer along the banks with a variety of riparian grasses and wetland sedges along the main channel and banks. The main channel and banks contain a variety of grasses with the smaller systems containing terrestrial species, but which also often occur in riparian vegetation. Riparian grasses which dominated include *Cynodon dactylon, Digitaria eriantha, Sporobolus fimbriatus, Panicum coloratum, Setaria sphacelatum, Echinchloa holubii* and *Setaria pallide-fusca*. However, in all these systems, at least some obligate wetland vegetation was noted. These included sedges such as *Cyperus longus, Cyperus dastigiatus* and wetland grasses such as *Leptochloa fusca*. Other aquatic or semi-aquatic plants also included *Marsilea farinosa, Mimulus gracilis, Ranunculus multifidus, Conyza podocephala, Alternanthera sessilis* and *Persicaria lapathifolia*. A protected and rather uncommon plant, *Kniphofia ensifolia*, also occurs along these watercourses and is of significant conservation value. Riparian trees and shrubs are also abundant along these smaller watercourses and include *Vachellia karroo, Diospyros lycioides, Asparagus larcinus, Searsia pyroides* and *Ziziphus mucronata*. Exotic weeds are also quite common along these small watercourses and include *Bidens bispinosa, Xanthium strumarium* and *Verbena bonariensis*.

Table 11: Summary of lateral streams and drainage lines (table obtained from the Wetland and Riparian Assessment).

Watercourse	Position of crossing
#1 Large stream along western border	S 28.145726°, E 26.650782°
#2 Small western drainage line	S 28.143700°, E 26.653049°
#3 Small western drainage line	S 28.141498°, E 26.662887°
#4 Large western stream system	S 28.141230°, E 26.665105°
#5 Small central drainage line	S 28.139496°, E 26.670037°
#6 Small western drainage line	S 28.138924°, E 26.659085°
#7 Large central stream system	S 28.137550°, E 26.667190°
#8 Large central drainage line	S 28.135598°, E 26.672126°
#9 Small central drainage line	S 28.138894°, E 26.674167°
#10 Small central drainage line	S 28.140412°, E 26.676099°
#11 Large central eroded stream system	S 28.144245°, E 26.678915°
#12 Large central stream system	S 28.140339°, E 26.682780°
#13 Small eastern stream system	S 28.132643°, E 26.683387°
#14 Small eastern stream system	S 28.136138°, E 26.689180°
#15 Small eastern drainage line	S 28.134184°, E 26.689116°
#16 Small eastern drainage line	S 28.134232°, E 26.691491°
#17 Small eastern drainage line	S 28.131851°, E 26.690946°
#18 Small eastern drainage line	S 28.130689°, E 26.693261°

Figure 39: The study area contains many large stream systems which clearly flow on a seasonal basis (image obtained from the Wetland and Riparian Assessment).

Figure 40: One of the drainage systems in the central portion of the study area is characterised by high amounts of natural erosion. All the streams and drainage lines will also be susceptible to increased erosion should mining have any impact on them (image obtained from the Wetland and Riparian Assessment).

1.5 Water Quality and Comparison with Background Values

Comprehensive water quality analysis showed that the Sand River contains fairly high values of coliforms and *E. coli*. This is however not regarded as a result of sewage discharge from a Wastewater Treatment Works but may be linked to smaller localised ablution facilities along the river as well as from livestock grazing along the river and the resulting manure that enters the river. These bacteriological values indicate that the water is not suitable for consumption but do not pose a significant risk for full contact recreation (refer to Table 3 of the Wetland and Riparian Assessment attached as Appendix G for a summary of the bacteriological results of the water in the Sand River).

In terms of the chemical water quality parameters the water within Sand River seem to fall within the excepted standards. High levels of turbidity during the current sampling may be a result of the recent flooding of the river.

According to diatom sampling results the Sand River at the site is characterised by poor biological water quality with significant nutrient and organic loads. In addition, high salt concentrations are notable which may be a consequence of the upstream diamond mining operations.

1.6 Conditions and Importance of the Affected Watercourses

The determination of the condition of the Sand River, associated floodplain and lateral watercourses in the study area was based on an overall determination of the Index of Habitat Integrity (IHI). Due to the numerous lateral streams and drainage lines situated along the floodplain of the Sand River the determination of the IHI was limited to an overall IHI of the Sand River. The IHI is considered to give a good representation of the condition of the system within the study area which will be affected by the proposed

mining operations. The IHI was then taken as representative of the Present Ecological State (PES) of this system.

In addition, the backwater floodplain wetland areas occurring adjacent to the main channel of the river, although part of this system, also functions independently from it to a large degree. To provide a further indication of the condition of these floodplain wetland areas, a WET-Health determination was done for one of the larger floodplain wetlands to serve as a representative of these wetland systems. The WET-Health was then taken as representative of the Present Ecological State (PES) of this system.

According to Kleynhans (2000) a desktop assessment of the Sand River in the study area and which will be affected by mining operations is considered to have a PES of Category C: Moderately Modified. More recent desktop assessments (Van Deventer et al 2018) also confirm this assessment. On-site observation indicate that this is relatively accurate as this study has also calculated the river as having a PES of Category C: Moderately Modified. Despite this the system still provides vital services including water transportation, flood dissipation, wetland and riparian habitat and support of ecological processes. The system should still be regarded as sensitive with a very high conservation value and mining should endeavour to keep impacts on it to a minimum.

It is evident that a reduction in flood frequency and magnitude has a definite effect and alteration of riparian communities. Impacts and land use in the surrounding catchment as well as riparian areas are numerous and cause significant modification of the Sand River. The area is subjected to extensive gold mining operations. This type of mining has several highly deleterious impacts including acid mine drainage. This will undoubtedly also affect the river. The current sand mining activities itself also has several impacts on the river. These impacts are currently localised and still contained within a small area but may become more extensive as mining is expanded. This will undoubtedly contribute to the sediment load of the river. The increased sediment leads to impacts such as sedimentation of unique bedrock communities, a decrease in instream and marginal macrophytes and impacts on the aquatic community. Centre-pivot irrigation takes place along the river in upstream and downstream areas. In addition, dryland crop cultivation is also extensive in the surrounding catchment. This will impact on the river because of fertiliser runoff and enrichment, pesticides and other impacts associated with commercial irrigation. Due to the clearing of natural vegetation the surface runoff velocity will increase, and groundwater infiltration will decrease. This will increase erosion and consequently sediment load in the river. An impact associated with crop irrigation will also be a decrease in baseflow of the river. Water

abstraction for irrigation from the river will decrease the amount of baseflow and alter the flow regime in the river and will increase zero flows. The river also flows through the urban area of Virginia and surroundings and the impacts associated with the urban area will include increase runoff and refuse in the river. The towns wastewater treatment works also releases effluent into the river which is likely to affect the water quality of the river to some degree depending on the operation of the works. Most of the impacts or land uses described above also require to varying degrees, abstraction from the river. Though most of these do not require large volumes by themselves, though cumulatively, large volumes of water are being abstracted from the river contributing to considerable decreases in flow volumes. This also has a large impact on the natural flow regime of the river.

According to previous desktop assessments (Kleynhans 2000, Van Deventer et al 2018) those floodplain wetlands that had been identified along the Sand River is considered to have a PES of Category A/B: Natural to Largely Natural. The current survey indicates this to be somewhat overestimated though they do remain largely natural. A few impacts have resulted in a low level of modification to these floodplain wetland areas. A few small dirt tracks adjacent to these wetland areas would have a low impact in terms of flow modification. Overgrazing and trampling by domestic livestock were also notable in these wetland areas and this would also contribute an additional low impact on these systems. Coupled with this are also foraging excavations by the invasive Warthog (*Phacochoerus africanus*) which is not native to the grassland biome and can cause significant disturbance in natural areas. The main impact on these floodplain wetlands will be the change in their hydrology. Historically, these floodplain wetlands would have been fed to a significant degree by the overtopping of the river channel during flooding. However, due to flood control by the upstream Allemanskraal Dam this rarely, if ever, still occurs. These floodplain wetlands are now almost exclusively fed by runoff and groundwater inflow from the surrounding catchment. From the above, though these floodplain wetlands are still largely natural their condition would have been altered to some degree.

The Sand River and its associated floodplains are considered a third order watercourse. This is also due to the Sand River being a large lowland river. The quaternary catchment of this area is C42L. The largest impact on the study area is the construction of large upstream containment dam in the Sand River. These impacts alter the flooding regime and the functioning and habitat of the river and floodplains. As mentioned earlier, the results of the IHI indicated that the Sand River has an Instream IHI of category C: Moderately Modified and Riparian IHI of category C: Moderately Modified. This is largely due to the change in flooding regime and

disturbance/transformation of the habitat. The Sand River and associated wetlands and floodplains are somewhat modified by historical and current impacts.

The floodplain wetlands along the Sand River in the study area are clearly not affected by many impacts. A WET-Health determination was undertaken for one of the larger backwater areas to serve as representative for the floodplain wetland areas along the study area. The results of the WET-Health indicated an overall PES of Category B: Largely Natural. Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged. This is considered relatively accurate given the few impacts affecting it.

The EIS of the floodplains associated with the Sand River has been rated as being Moderate: Floodplains that are ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers. The riparian habitat associated with the river does not have a significant diversity of species. Diversity is also affected by numerous exotic weeds which form dense patches in areas. Diversity of habitats is considered moderate due to the variety in the vegetation structure varying from grassland to thicket. It is considered unlikely that the site will provide a significant feeding or migratory site for wetland species. Despite this it must be kept in mind that watercourses such as the Sand River provide a much richer system in terms of habitat and feeding ground when seen in comparison to most terrestrial ecosystems. Due to relatively low levels of diversity and uniformity of the river it will only be moderately sensitive to changes in hydrological regime and water quality changes. The extensive floodplain will play a moderate role in flood storage, energy dissipation and particulate removal. The protected status of the river must still be considered as high as it is a major river providing vital services. The ecological integrity of the river is moderate as it has been affected by several upstream impacts.

1.7 Buffer Zone Determination

As indicated earlier, the Sand River, its floodplain, lateral drainage lines and backwater wetland areas provide several vital ecological services, and it is important that operations not result in further impacts on them.

The main channel of the Sand River, the associated wetland conditions occurring along the marginal and lower zones, all lateral drainage lines and backwater wetland areas are all regarded as being of very high sensitivity. In the specialist's opinion these areas should be treated as no-go areas and should be avoided, as far as possible by the

proposed sand mining operations. This will however not be possible where sand is excavated from the lower zone or where sand pumping is done from the main channel. In these instances, the specialist proposed that the operational area (processing/stockpile area, sand screen, settling ponds and all other associated structures and infrastructure) should at least be located outside the areas of high sensitivity.

In addition, the specialist recommended a buffer for the areas of very high sensitivity. It should be noted however that the buffers determined by the model use by the specialist only caters for wetland systems and impacts associated with diffuse-source surface runoff. As a result, the buffer was determined only for the backwater wetland systems, although this buffer should in the specialist's opinion also be applied to the river channel, associated wetland conditions and lateral stream systems. The specialist determined that a buffer of 38 m from the edge of the floodplain wetland areas and the wetland conditions along the Sand River main channel and lateral stream systems must be maintained as indicated in the following figure (also attached as Appendix A, Map 2 of the Wetland and Riparian Assessment).

The 38-meter buffer zone is regarded as having a high sensitivity. The portions of the floodplain outside this 38-meter buffer are still regarded as having a moderate sensitivity but impacts here will be more easily manageable. As a result, mining operations, except for one sand pump and associated access, should aim to avoid all areas regarded as having a very high and high level of sensitivity, while focussing operations in areas with moderate sensitivity.

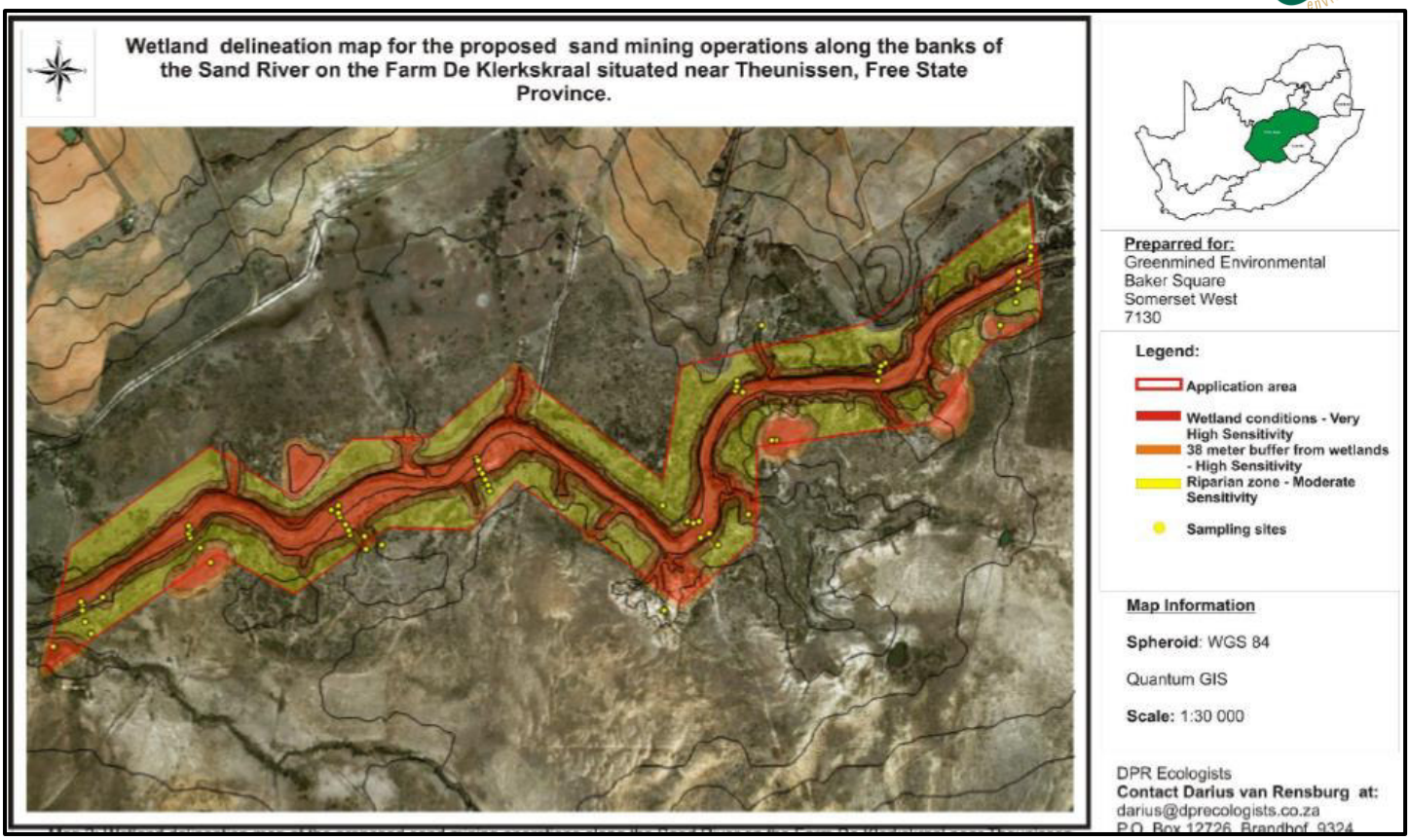


Figure 41: Wetland delineation map that shows the proposed buffer areas (image obtained from the Wetland and Riparian Assessment).

1.8 Risk Assessment

A Risk Assessment for the proposed sand mining operations along the Sand River has been undertaken according to the DWS requirements. Activities which will be implemented by the sand mining operations, and which may affect the Sand River include:

- the extraction (via pump and float) of sand from the main channel,
- an access road and pump structure along the bank,
- excavation of sand from the banks of the river and a processing and stockpile area in the floodplain of the river.

The sand mining operations will entail the excavation of sand from the banks and floodplain of the river. Sand is continuously deposited along the banks of the river by flooding events. These sands are exposed along the lower zone when the river is at its baseflow level. It is largely these sands that will be excavated by the mining operations by means of excavators and transported by means of a small dirt access road to stockpiling areas in the floodplain. Impacts associated with this (prior to mitigation) will include:

- modification of the geomorphology,

- loss of some of the riparian vegetation,
- contributing toward increased sedimentation of the river, and
- causing local modification and de-stabilisation of the bank.

Given the large extent of the proposed mining right area (approximately 230 hectares) this may potentially result in high impacts. To limit this impact, the specialist supports the recommendation that sand excavation areas be limited to an extent of 5 hectares at a time (two minor areas). The specialist noted that sand should be excavated, processed and the area rehabilitated before moving to a new sand mining area. If this mining method is maintained, the risk is anticipated to remain moderate. This is however subject to comprehensive mitigation and rehabilitation measures being implemented.

An additional mining method is the proposed pumping of sand from the main channel by means of a sand pump, associated infrastructure and an access road along the riverbank will have the following impacts according to the specialist (before mitigation):

- affect the geomorphology,
- affect the aquatic fauna dependant on the sandy habitat, and
- cause local modification of the bank.

If, these extraction areas are limited to the 5 ha sand excavation sites, and to one extraction point (from the river) at a time, the extent of the impact should be limited and confined to the site. The risk is therefore anticipated to remain moderate.

The establishment of settling ponds will have the following most prominent impacts (before mitigation):

- removal of riparian vegetation and disturbance of the soil surface,
- increased sediment washing into the river, and
- likely flooding of the stockpiling area during large floods.

The anticipated risk is however anticipated to remain moderate.

According to the WRA, Moderate Sensitivity is normally applicable to areas that are still natural and therefore does still have some ecological importance, but which do not contain elements of high conservation value and are not essential to the continued functioning of surrounding areas. Areas of Moderate Sensitivity usually require some mitigation but can be developed without resulting in high impacts.

1.9 Biodiversity Sensitivity Rating (BSR)

1.9.1 Habitat Diversity and Species Richness:

Habitat diversity in the study area is considered relatively high. The area contains riparian thicket, floodplain, lateral stream systems, reed beds, aquatic habitat, and backwater wetlands in the floodplain. The surrounding terrestrial habitats being dominated by grassland also contribute significantly toward habitat and species diversity. The habitat diversity is therefore regarded as high, though despite this, species diversity remains moderate.

1.9.2 Presence of Rare and Endangered Species:

No rare or endangered species were encountered in the area, and it is also not known to contain such species. A few protected species had been observed in the surrounding areas and may also be likely to occur on the site. These include *Ammocharis coranica, Kniphofia ensifolia* and *Crinum bulbispermum*.

Most of these species are relatively widespread and common and therefore not of exceptionally high conservation value. However, as protected species all of them still retain some conservation significance.

1.9.3 Ecological Function:

The ecological function of the study area and surroundings are still fairly natural and intact though the river itself is moderately modified, mostly by upstream impacts. The site functions as habitat for a variety of fauna, supports a specific vegetation type and contain numerous watercourses, including the Sand River, performing important functions in terms of water transportation, wetland and riparian habitats and bio-remediation. Natural vegetation still dominated the area, though a low level of disturbance is still evident. As a result, the habitat provided for fauna is still largely intact and given the fact that watercourses can sustain a higher bioload and much more diverse faunal population, it further increases the importance of its ecological function. The Sand River, its floodplain, lateral stream system and backwater wetland areas provide numerous vital ecosystem functions and consequently the overall ecological function of the area must be regarded as high.

1.9.4 Degree of Rarity/Conservation Value:

The Highveld Alluvial Vegetation (Aza5) is listed as being of Least Concern (LC). It is a widespread vegetation type and not currently subjected to any pronounced

development pressures. The conservation value of the vegetation type would therefore be relatively low.

All watercourses including the Sand River, floodplain, backwater wetland areas and lateral stream systems are considered sensitive ecosystems and their conservation value must therefore be considered as relatively high.

1.9.5 Percentage Groundcover:

The region is characterised by a moderate climate and consequently would also sustain a moderate percentage vegetation cover. This was still the case in the study area and the percentage vegetation cover is regarded as unmodified.

1.9.6 Vegetation Structure:

The study area is situated within Highveld Alluvial Vegetation which is characterised by riparian thicket, herblands and flooded grassland. This is certainly still the case for the study area though historical aerial images indicate a substantial increase in the thicket component. Overall, the vegetation structure is therefore regarded as moderately modified.

1.9.7 Infestation with Exotic Weeds and Invader Plants:

Several weed species occur on the site predominately associated with the Sand River, especially the lower one but also being prominent in the floodplain. Overall, the study area is therefore considered to a contain a moderate infestation by weeds and invasive species.

1.9.8 Degree of Grazing/Browsing Impact:

Grazing by domestic stock is moderate. Grazing by domestic livestock was evident over the entire study area and significant trampling were noted on the banks of the river and therefore overgrazing is regarded as at least moderate.

1.9.9 Signs of Erosion:

Due to the slope, sandy soils, and drainage lines in the area it is subjected to moderate erosion. However, this erosion is considered as part of the natural ecosystem but is being exacerbated by the land use in the region (agriculture, trampling) and is also evident were dirt tracks and gravel roads cross over lateral watercourses.

Table 12: Biodiversity Sensitivity Rating for the Sand River mining area.

	Low (3)	Medium (2)	High (1)
Vegetation characteristics			
Habitat diversity & Species richness			1
Presence of rare and endangered species		2	
Ecological function			1
Uniqueness/conservation value			1
Vegetation condition			
Percentage ground cover			1
Vegetation structure		2	
Infestation with exotic weeds and invader plants or encroachers		2	
Degree of grazing/browsing impact		2	
Signs of erosion		2	
Terrestrial animal characteristics			
Presence of rare and endangered species		2	
Sub total	0	12	4
Total		16	

Table 13: Interpretation of the BSR.

Site	Score	Site Preference Rating	Value
Sand River mining area	16	Good Condition	2

1.10 Wetland and Riparian Assessment Discussion and Conclusion

The area for the proposed mining of the banks and floodplain of the Sand River is regarded as being in a relatively good condition. This is based largely on the characteristics of the ecosystem, i.e., conservation value, ecological function, and importance of the ecosystem as well the condition of the area which is largely still natural and unmodified.

The sand mining operations will mostly affect the banks and floodplain of the Sand River, though a sand pump in the river will also affect the main channel. The extent and nature of the mining operations are anticipated to have several significant impacts (prior to mitigation) on the river and its associated floodplain and wetland areas mainly associated with sedimentation and loss of aquatic and riparian habitat.

As indicated, the proposed mining area is still largely natural with the current sand mining area being the most significant current impact. Current mining causes the removal of riparian vegetation, modification of the riverbanks and transformation of the

geomorphology. This also provides an indication of the type of impacts that proposed mining would have.

Soil samples and vegetation cover reliably indicated that wetland conditions along the Sand River at the site is confined to the marginal and lower zones with perennial zones of wetness being present at the water's edge and the marginal zone, decreasing into a seasonal zone of wetness in the lower zone and with wetland conditions being absent from the upper zone of the river. The riparian zone of the river extending along both the northern and southern floodplain of the river is quite extensive. Though flooding may not necessarily extend over the riparian zone it does still contain the characteristics of a floodplain and is therefore still regarded as forming part of the riparian zone of the river. The soils within this riparian zone contain fine silty soils but it was devoid of wetland conditions. Furthermore, a few backwater floodplain wetlands also occur within the riparian zone.

Soil samples taken within several of the lateral drainage lines or seasonal streams indicated the clear presence of wetland conditions, at least for those portions of the streams situated within the proposed mining area. These systems discharge annually from runoff generated in the surrounding catchment but is also being inundated when floods within the Sand River push up into the lateral streams. These wetland conditions are however confined to the main channel of these watercourses with their banks consisting of riparian vegetation and forming part of the riparian zone.

The wetland conditions associated with the banks of the Sand River and lateral streams can be characterised as a channel wetland system. The wetland conditions are confined to the main channel of these systems which experience surface flow either seasonally or perennially. Where wetland conditions occur in the floodplain of the Sand River, small backwater depressions have formed, and these wetland conditions can be regarded as forming a floodplain wetland.

1.11 Wetland and Riparian Assessment Recommendations:

- The main channel of the Sand River, wetland conditions along the banks, lateral stream systems and floodplain wetland areas are all regarded as having a very high sensitivity and should wherever possible be excluded from mining operations.
  - A 38 m buffer zone around these areas is also regarded as having a high sensitivity and should also be excluded from operations.

- Mining operations should aim to avoid all areas regarded as having a very high and high level of sensitivity, while focussing operations in areas with moderate sensitivity.
- This may however not be possible where sand excavation takes place from the lower zone or banks of the river and where sand is pumped from the main channel. In such instances, the operational area (stockpile area, sand screen, settling dams and all other associated structures and infrastructure) should at least be located outside these areas of high sensitivity.
- The backwater floodplain wetlands and lateral stream systems do not contain sand resources and would not be desirable for mining. They should therefore be excluded from any mining operations or activities and treated as no-go areas.

❖ The exotic species occurring on the site must be eradicated as mining progresses. It is also recommended that the eradication of exotic species be rigidly maintained and form part of the management of the mining process.

❖ The following mitigation measures are recommended where mining activities will impact on the Sand River or its floodplain:

- The sand excavation areas should be limited to an extent of 5 hectares at a time. Sand should be excavated, processed and the area rehabilitated before moving to a new sand mining area.
- Only one pump, including infrastructure and access road, should be utilised at any time and the site rehabilitated immediately after moving the pump to another location along the site.
- Any disturbance of the riverbank should be adequately rehabilitated which must include re-instatement of the natural topography, replacement of topsoil, prevention of erosion and monitoring and eradication of problematic weeds and invasives.
- Where disturbance of the banks or floodplain takes place the removal of vegetation must be kept to a minimum.
- Implementing consecutive rehabilitation to preserve the integrity of the system.
- Keeping disturbance of the marginal zone and steep banks of the river to a minimum.
- The stockpile area is situated within the floodplain and requires the removal of vegetation. Where disturbance of the soil surface will occur, the topsoil should first be removed and stored on site and should be utilised once rehabilitation of the site takes place.

- Adequate storm water management measures should be implemented and should include diverting storm- and floodwater around the stockpile and excavation areas and preventing sediment and silt from entering the river.
- As the stockpile areas and several of the sand excavation areas are in the floodplain and along the riverbanks they will also be affected by annual flooding and the necessary precautions should therefore be taken to ensure that floodwaters are diverted around them by means of berms.
- Where excavation of sand takes place within the floodplain and along the riverbanks the rehabilitation should endeavour to re-instate a geomorphology which will form part of a functional system and should refrain from leaving excavations or pits.
- Due to the high abundance of exotic weeds currently on the site it will be difficult to keep the site weed-free. Seeding of bare areas with indigenous pioneer grasses should be considered as this will provide competition for exotic species.

❖ The hunting, capturing, and trapping of fauna should be prevented by making this a punishable offense during the mining operations.

❖ No littering must be allowed, and all litter must be removed from the site.

❖ Monitoring of mining and compliance with recommended mitigation measures must take place.

❖ After mining has ceased all construction materials should be removed from the area.

❖ Comprehensive rehabilitation should be implemented after mining ceased. This should include re-instatement of the natural topography as far as possible, replacing topsoil in disturbed areas, prevention of erosion and monitoring and eradication of exotic invasive species.

❖ The proposed mining operations will result in significant impacts on the banks and main channel of the river. A comprehensive monitoring programme should therefore be followed to quantify impacts and recommend mitigation. Such monitoring should include quarterly water quality sampling, sediment release (turbidity), Index of Habitat Integrity and SASS5 or a combination thereof.

❖ Mining operations within 100 meters or within the floodplain of the river and within 500 meters of wetland areas will require authorisation from DWS.

2. AQUATIC ASSESSMENT

The primary objective of the aquatic assessment was to establish the present ecological state of the river and impacts of the sand mining plant on the aquatic ecosystems. The sampling sites (as shown in the following table) were chosen based on the position of the sand mining plant and to be representing of the available habitats.

Table 14: Selected sampling sites (table obtained from the Specialist Aquatic Assessment).

RIVER	SITE POSITION	SITE NAME	LATITUDE	LONGITUDE	SAMPLING DATE
Sand	Upstream of sand mine area	SU	-28.130383°S	26.695990°E	12/03/2022
Sand	Downstream of existing mining area	SM	-28.137827°S	26.670233°E	12/03/2022
Sand	Downstream of sand mine area	SD	-28.144218°S	26.651203°E	12/03/2022

The following tables present the results of the field sampling.

Table 15: Sampling results and associated information for SU (table obtained from the Specialist Aquatic Assessment).

SU	
UPSTREAM	*DOWNSTREAM*
2022	
	
River	Sand River
Site Description	Perennial river located on the farm, De Klerks Kraal
GPS co-ordinates of sampling point	-28.130383°S; 26.695990°E
Quaternary Catchment	C42L
WMA (Midgley *et al.* 1994)	Middle Vaal Water Management Area 9
Ecoregion Name	Highveld - Lower
Regional Vegetation Type	Highveld Alluvial
Riparian Vegetation Type	Grasses and Sedges
Geomorphological Zonation (Rowntree and Wadeson 2000)	Lowland river
Channel Type:	Valley bottom with channel
Water Turbidity (Dallas 2005)	Silty
Dominant Velocity-depth Classes	Slow shallow, Slow deep
Dominant Biotope Diversity	Pools and run

Water Quality Parameters		T(°C) = 24; pH = 7.58; EC (mS/m) = 55.80; DO (%) = 82							
Other Biota		Fish							
Highly Sensitive Taxa (Score 11-15)		None							
DATE	**SAMPLER**	**SASS5**	**ASPT**	**No of Taxa**	**PER CLASS**	**IHAS**	**IHI**	**MIRAI**	**FRAI**
12/03/2022	A. Strydom	**66**	**4.40**	**15**	**D**	**D**	**D**	**D**	**D**
EXISTING THREATS		• Agriculture • Flow modifications • Sedimentation							

Table 16: Sampling results and associated information for SM (table obtained from the Specialist Aquatic Assessment).

SM	
UPSTREAM	***DOWNSTREAM***
2022	
	
River	Sand River
Site Description	Perennial river located on the farm, De Klerks Kraal
GPS co-ordinates of sampling point	-28.137827°S; 26.670233°E
Quaternary Catchment	C42L
WMA (Midgley *et al.* 1994)	Middle Vaal Water Management Area 9
Ecoregion Name	Highveld - Lower
Regional Vegetation Type	Highveld Alluvial
Riparian Vegetation Type	Grasses and Sedges
Geomorphological Zonation (Rowntree and Wadeson 2000)	Lowland river
Channel Type:	Valley bottom with channel

Water Turbidity (Dallas 2005)	Silty
Dominant Velocity-depth Classes	Slow shallow, Slow deep
Dominant Biotope Diversity	Pools and run
Water Quality Parameters	T(°C) = 24; pH = 7.55; EC (mS/m) = 55.50; DO (%) = 81
Other Biota	Fish
Highly Sensitive Taxa (Score 11-15)	None

DATE	SAMPLER	SASS5	ASPT	No of Taxa	PER CLASS	IHAS	IHI	MIRAI	FRAI
12/03/2022	A. Strydom	54	4.50	12	D	D	D	D	D

EXISTING THREATS	• Agriculture & sand mining • Flow modification • Sedimentation

Table 17: Sampling results and associated information for SD (table obtained from the Specialist Aquatic Assessment).

SD	
UPSTREAM	*DOWNSTREAM*
2022	
	
River	Sand River
Site Description	Perennial river located on the farm, De Klerks Kraal
GPS co-ordinates of sampling point	-28.144218°S; 26.651203°E
Quaternary Catchment	C42L
WMA (Midgley *et al.* 1994)	Middle Vaal Water Management Area 9
Ecoregion Name	Highveld - Lower
Regional Vegetation Type	Highveld Alluvial
Riparian Vegetation Type	Grasses and Sedges
Geomorphological Zonation (Rowntree and Wadeson 2000)	Lowland river
Channel Type:	Valley bottom with channel
Water Turbidity (Dallas 2005)	Silty
Dominant Velocity-depth Classes	Slow shallow, Slow deep

Dominant Biotope Diversity		Pools and run							
Water Quality Parameters		T(°C) = 24; pH = 7.63; EC (mS/m) = 53.20; DO (%) = 83							
Other Biota		Fish							
Highly Sensitive Taxa (Score 11-15)		None							
DATE	**SAMPLER**	**SASS5**	**ASPT**	**No of Taxa**	**PER CLASS**	**IHAS**	**IHI**	**MIRAI**	**FRAI**
12/03/2022	A. Strydom	**65**	**4.64**	**14**	**D**	**D**	**D**	**D**	**D**
EXISTING THREATS		• Agriculture • Flow modification • Sedimentation							

The Specialist Aquatic Assessment notes that the physical water quality indicated overall good results. Comparing the results of the TWQR (Target Water Quality Range) it is observed that the water quality at the site shows no deterioration from recommended guidelines and all the values fell within the target water quality range.

The habitat integrities of the sites were assessed. The riparian and instream habitats were classified as being largely modified (D) for all the sites sampled. In general, the deterioration of the sites was largely due to bed modifications from channel and flow modifications (SU, SM and SD) caused by siltation, agriculture, and other anthropogenic upstream activities. These habitat modifications directly and indirectly changed the biotope availability, velocity-depth flow structures, which influenced the biotic component of the ecosystem at the sites.

The PES and impacts on the macro-invertebrate communities were assessed using SASS5 and ASPT scores. The macro-invertebrate integrity during the current survey was calculated to be largely modified (D) for all sites. The ASPT (Average Score Per Taxon) scores indicated the family diversity mainly consisted of tolerant species resulting in all three sites to be classified as largely modified (D) during the current survey. The specialist notes that the reference list of the macro-invertebrates consisted out of 33 families. From the reference list it can be indicated that the sites are impacted on because much less species (10-12) were sampled at the sites, compared to reference conditions. This result suggests that the macro-invertebrate communities were impacted due to possible deteriorated water quality and habitat, as discussed above.

The MIRAI (Macroinvertebrate Response Assessment Index) score and EC (Ecological Category) of the current study showed that all sites for the current survey were calculated to being largely modified (D), compared to reference conditions. A

further indication that these macro-invertebrate community structures were impacted on, was through the assessment of the abundances of present families. High abundances of tolerant families such as Corixidae was observed at the sites during the current assessment. MIRAI measures the response of the macro-invertebrates to certain drivers, namely flow, habitat, and water quality. The modification in flow (caused by abstraction, impoundments, agriculture, and mining) and increase of siltation with the absence of vegetation and stones biotopes, caused the absence of various families that prefer the vegetation and stones biotopes and an increase in families preferring gravel, sand and mud habitats, respectively. None of the macro-invertebrates sampled were sensitive.

When assessing the fish diversity, it was found that the sampled sites on the Sand River did not have a diverse number of habitats with no fast - flowing habitats (fast-shallow, fast-deep) available at the sites during the current survey. Only five (5) of the expected indigenous fish species and two (2) alien species were sampled in the current study area as indicated in the following table.

Table 18: Reference and current fish frequency of occurrence (table obtained from the Specialist Aquatic Assessment).

	Ref. FO	SU	SM	SD
# of indigenous species	9	**4**	**5**	**5**
Total abundances	4	**10**	**37**	**21**
# of exotic species	3	**1**	**2**	**1**
***FRAI** score %*	NA	**48**	**44**	**46**
FRAI EC	NA	**D**	**D**	**D**
Barbus anoplus	4	3	8	1
Clarias gariepinus	4	-	1	2
Austraglanis sclateri	1	-	-	-
Labeo capensis	4	-	-	-
Labeo umbratus	4	-	-	-
Labeobarbus aeneus	4	2	2	1
Labeobarbus kimberleyensis	1	-	-	-
Pseudocrenilabrus philander	4	1	6	4
Tilapia sparrmanii	4	2	4	5
Cyprinus carpio	NA	1	1	1
Gambusia affinis	NA	2	15	8
Mycropterus salmoides	NA	-	-	-
- Not sampled; NA = Not available				

The PES for the sites sampled during the current survey was largely modified (D). The baseline study indicates that there is a deterioration in the fish community assemblages in the area compared to expected reference list. This was because only seven (7) of the 12 expected species were sampled when determining the FRAI (Fish Response Assessment Index). Although only seven of the reference list species were sampled of the possible 12 at the sites, all of the twelve species expected under reference conditions are still expected to be present under the present conditions at these sites and in the river. This was probably because of reduced habitat availability and the migration barriers formed by the weirs present upstream of the site. It is expected that species which are moderately intolerant to no flow conditions (*Lb. kimberleyensis* and *A. sclateri*) will still be present as they will survive and be sustained in the current habitat for extended periods, but that their spawning success and recruitment will be reduced.

Due to flow modification and floods, there is a loss of FD and FS habitats as well as substrate as cover, reducing the occurrence of *A. sclateri, L. umbratus* and *Lb. kimberleyensis*. Deep pools are present, and all the species will be able to utilise the pools as cover and refugia. The presence of the alien species *G. affinis* (mosquitofish) and *C. carpio* (carp) at all the sites may also have an impact on the occurrence of indigenous species as these species are known to impact other species in competition for suitable breeding habitat.

The current survey indicates that there is deterioration in the fish community assemblages in the area compared to expected reference list. This may be attributed at least in part to an overestimation of the expected fish species at the sites. Further, due to flow and channel modifications and severe siltation there is a loss in available habitats which may also have an impact on the occurrence of indigenous species.

In conclusion the Specialist Aquatic Assessment found that:

- The aquatic habitats were impacted due to general catchment activities including upstream agricultural and anthropogenic activities and weirs that induced modifications to flow regime, in-stream channel, and water quality.
- The aquatic biota was also modified from natural assemblages. The macro-invertebrate assemblages were largely modified due to alterations in the habitat and abundance of tolerant families. The fish assemblages were also impacted, with only 7 of the expected fish species present during this study due to modified habitat and flow at the sites.

- The aquatic ecosystem within the surrounding area of the sand mine was assessed as being largely modified (D) in relation to the habitat integrity, macro-invertebrate as well as for the fish assessment, after the current survey.
- Most of the impacts on this system were associated with agriculture, existing sand mines and instream habitat changes.
- The physical water quality results during the current survey indicated that the water quality was generally good at all the sampled sites.
- As the study area does not fall within a Freshwater Ecological Protected Area (FEPA) it is not governed by its stringent management guidelines. However, normal guidelines should still be adhered to regarding any development as well as future management of the river. The impacts of the sand mine in the system were found to cause potential loss of aquatic habitat and increased turbidity and siltation in the river. The possible impacts will influence the water quality and on the biotic integrity of the system and needs to be continuously monitored to limit any adverse effects.

The specialist identified the following potential impacts that may result from the proposed sand mining activities:

- Flow and channel modification,
- Increased turbidity and siltation of the river and aquatic habitats,
- Potential loss of aquatic habitats.

The specialist proposed the following mitigation measures towards future impacts from the sand mine development on the freshwater biota:

- The extent of the sand mining area should be limited to minimise environmental damage.
- The extraction of river sand should be conducted sustainably and must not compromise the flow of the river or divert the main flow of the river.
- Monitor in-situ water quality (including turbidity) upstream and downstream of the mine extent monthly during extraction activities.
- All rehabilitation and monitoring measures must ensure that disturbed areas are rehabilitated to pre-mining conditions.
- Continued bi-annual monitoring of the habitat, macro-invertebrate, and fish communities at these sites, which vary seasonally.
- Monitor siltation within the river segment downstream of activities.

SITE SPECIFIC TERRESTRIAL FAUNA

The Map of Relative Animal Species Theme Sensitivity, from the DEFF Screening Report for an environmental authorisation application as required by the 2014 EIA Regulations (as amended), shows that the study area has a low sensitivity rating. Further to this and as mentioned earlier when the study area is placed on the Mining and Biodiversity Map the proposed mining footprint does not enter any areas of biodiversity importance.

Although the land use of Portion 0 & 1 (Remaining Extent) of the farm De Klerks Kraal No 231 has been extended to include additional activities (other than agriculture), the ecologist reported that most of the study area (where mining is proposed) is largely natural. As mentioned earlier the landowners keep livestock and game, but apart from the domestic animals, faunal action is mainly contained to the natural vegetated parts of the farms that provide shelter to the various species. Natural occurring faunal species are however sparse because of human activities in the general areas.

Mammals:

When the Quarter Degree Grid Cells (QDGC) code of the study area is placed on the MammalMAP from the Virtual Museum of African Mammals, it shows only eight known species that have been recorded in the area. This list was however expanded upon, as presented below, through discussions with the locals and visits to the area.

- Aardvark (LC) *Orycteropus afer*
- Aardwolf (LC) *Proteles cristatus*
- Bat-eared Fox (LC) *Otocyon megalotis*
- Black-backed Jackal (LC) *Canis mesomelas*
- Brown Hyena (NT) *Hyaena brunnea*
- Cape Clawless Otter (NT) *Aonyx capensis*
- Cape Hare (LC) *Lepus capensis*
- Grey Duiker (LC) *Sylvicapra grimmia*
- Porcupine (LC) *Hystrix africaeaustralis*
- Scrub Hare (LC) *Lepus saxatilis*
- Small-spotted Genet (LC) *Genetta genetta*
- Springhare (LC) *Pedetes capensis*
- Steenbok (LC) *Raphicerus campestris*
- Striped Polecat (LC) *Ictonyx striatus*
- Vervet Monkey (LC) *Cercopithecus aethiops*
- Warthog (LC) *Phacochoerus africanus*

- Water mongoose (LC) *Atilax paludinosus*
- Yellow mongoose (LC) *Cynictis penicillata*

As presented above, nearly all the species has a conservation status of Least Concern (LC), while only the otter and brown hyena are considered Near Threatened (NT). No threatened species are known to occur in the study area. When the faunal action of the property is evaluated in terms of co-existence with the current sand mining on the farm, it is evident that the species adapted well to the human activities along the riverfront and has to a certain degree been desensitized. Although very little animals are seen during the day (when the mine is operational), the nocturnal species frequently travel through the exposed mining areas as is evident from their tracks left in the sand.

Considering this, and the adaptability shown by these animals to changes in their environment, it is proposed that should future mining activities be confined to a maximum of two minor areas at a time (maximum of 5 ha) supported by one processing area (1.5 ha), and progressive rehabilitation, the faunal component of the area would be able to adapt to the changes. Fragmentation of the natural habitats could negatively affect the larger species, and therefore it is proposed that the mining activities be demarcated with beacons rather than being fenced off, as this will allow free movement of roaming species in and out of the work areas. To minimise the impact on the faunal component it is proposed that all operations are restricted to normal working hours, and daily inspected for trapped and/or injured species in need of assistance. Any such species must then be assisted/relocated to a safe area by a competent person.

The occurrence of, and likelihood that the proposed sand mining activities, may affect any bat species in the study area was discussed with a zoologist that specialises in small mammals. The specialist confirmed that there was no cause for concern that the proposed activities, if restricted to daylight hours, will have a negative impact on the potential Chiroptera that may occur in the area. Bats are almost all insect-eating that forage at night. The most common South African bat species are usually associated with human residences and manmade structures; however, no bats have thus far been recorded to frequent the existing mining structures at the property. However, should site management note any bats within the area, it is proposed that the opinion of an appropriately qualified specialist will be obtained.

Birds:

Approximately 158 species are expected to occur in QDGC 2826BA according to the BirdPix Map of the Biodiversity and Development Institute's Virtual Museum. A few of the most known species (previously noted on site) were listed below.

- Black-shouldered Kite (LC) *Elanus caeruleus*
- Blacksmith Lapwing (LC) *Vanellus armatus*
- Cape Sparrow (LC) *Passer melanurus*
- Cattle Egret (LC) *Bubulcus ibis*
- Dideric Cuckoo (LC) *Chrysococcyx caprius*
- Double-banded Courser (LC) *Rhinoptilus africanus*
- Egyptian Goose (LC) *Alopochen aegyptiaca*
- Laughing Dove (LC) *Streptopelia senegalensis*
- Little Swift (LC) *Apus affinis*
- Northern Black Korhaan (LC) *Afrotis afraoides*
- Ostrich (LC) *Struthio camelus*
- Pin-tailed Whydah (LC) *Vidua macroura*
- Red-crested Cuckoo (LC) *Cuculus solitarius*
- Red-eyed Dove (LC) *Streptopelia semitorquata*
- South African Shelduck (LC) *Tadorna cana*
- Southern Red Bishop (LC) *Euplectes orix*
- White-backed Mousebird (LC) *Colius colius*
- White-rumped Swift (LC) *Apus caffer*
- Yellow Canary (LC) *Serinus flaviventris*
- Yellow-crowned Bishop (LC) *Euplectes afer*

No threatened species are known to occur within the study area. The known species are all Least Concern in terms of conservation status and has been co-existing with the sand mining activities since commencement. The bird species are all highly mobile and can readily move away from disturbance. As mentioned earlier, the existing mine co-exists well with the fauna in the area, and this is also true for the avifaunal component of the farm.

As mining of new areas will require the clearance of riparian vegetation, it may reduce the presence of riparian bush needed for nesting by some of the species. However, should the size of the mining activities be minimised to 5 ha, and mined areas be rehabilitated as proposed in this document, the impact is deemed to be acceptable. If possible, it is suggested that the rehabilitated areas are not only seeded with grass,

but that fast-growing trees/bushes be planted where possible to replace the lost riparian bush used by birds as shelter, perching and nesting.

Other Animals:

Although the reptile, and insect component of the area were not assessed, the same conditions (as discussed earlier) apply, in that the mining areas must be kept to the smallest possible footprint, retaining the vegetation component for as long as possible. Reptiles, such as snakes and tortoises, that do enter or get trapped in the operational areas, must be safely relocated away from the mine by a competent person. No species that enter the mining area may be caught, played with, killed, or sold.

All operations must be restricted to daylight hours, to afford nocturnal animals the leeway of free movement. No excessive lighting may be placed at the mining area that could affect the habitual activities of species such as bats, owls, moths, frogs etc.

SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT

(Refer to the 2022 Heritage Impact Assessment, October 2020 attached as Appendix J)

The Heritage Impact Assessment (HIA) notes that the archaeological record for the greater study area consists of the Stone Age, Iron Age and Historical Period.

Stone Age:

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age (LSA), the Middle Stone Age (MSA) and the Earlier Stone Age (ESAg). Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges.

The three main phases can be divided as follows:

- Later Stone Age associated with the period from ±25 000-yrs before present to the period of contact with either Iron Age farmers or European colonists;
- Middle Stone Age includes various lithic industries in SA dating from ±250 000 yrs. – 25 000 yrs. before present;
- Earlier Stone Age associated with the period from ±2.5 million yrs. - ±250 000 yrs. ago.

Iron Age:

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell, 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The first 1 000 years is called the Early Iron Age.

No sites dating to the Early or Middle Iron Age have been recorded or is expected for the study area. The same goes for the Later Iron Age period where the study area is situated outside the western periphery of known distribution of Late Iron Age settlements in the Free State. To the east Makgwareng ceramics belonging to the Blackburn Branch of the Urewe tradition was recorded (Dreyer 1992 and Maggs 1976). There is however a low likelihood of finding sites dating to this period in the study area.

Historical Information:

There was some resistance to the establishment of the town Theunissen. In 1906 a group of Boer settlers, under the leadership of Commandant Helgaardt Theunissen, sent a request to the Free State government to establish a town on the farm Smaldeel and a portion of Poortjie (measuring a total of 1158 hectares). A railway station had been established on the farm Smaldeel by that time. There was however another group of settlers in the town of Winburg and the surrounding district who set up a petition against the establishment of a town in such proximity to Winburg. 67 Persons signed the petition, arguing that the establishment of a town on Smaldeel would negatively affect trade and business in the area. The government however found that there was sufficient motivation for the town to be established, and permission for the establishment of a town was therefore granted in 1907. The new settlement was first known as Smaldeel or Winburgweg, but in 1909 became known as Theunissen. Commandant Helgaardt Theunissen was regarded to be the “father” of the town. (Niehaber et al. 1982: 68).

Buildings of historical value in the town is the house of Sir Pierre van Ryneveld and a small fort, both located close to the original train station, on the eastern border of the town. The fort was constructed by the British forces during the Anglo-Boer War, when Lord Roberts occupied Van Ryneveld’s house and used it as his military headquarters. The fort was built to protect the house. (Niehaber et al. 1982: 68-69).

Heritage Resources:

The study area is fallow, marked by a thick cover of sand that is the target for mining activities. The river regularly floods it banks, effectively washing away any traces of heritage features if any ever occurred in these areas and is of low heritage significance. This was confirmed during the site visit, by the specialist, and no structures, graves or heritage finds of significance was recorded during the survey.

Cultural Landscape:

The study area is rural in character with no developments were indicated in the 1940's and 1980's aerial images of the area.

Palaeontological Heritage:

According to the SAHRA Paleontological map the study area is of moderate paleontological significance and an independent study (that was incorporated into the HIA) was conducted for this aspect. Bamford (2022) concluded that the proposed site lies on the Quaternary alluvium and sands alongside the Sand River. There is a chance that transported and fragmented robust fossils may have been washed down the river and incorporated into the sands. Such fossils, if present, would be of minimal scientific value because they would be out of primary context and their source unknown. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.

HIA Conclusion:

No heritage sites of significance occur within the impact area and no adverse impact to heritage resources is expected. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. The archaeologist notes that the mitigation measures as recommended in the HIA should be implemented during all phases of the project. Impacts of the project on heritage resources is expected to be low during all phases of the development (Van der Walt, 2022).

SITE SPECIFIC SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Social and Labour Plan of Vegablox (Pty) Ltd attached as Appendix K)

A Social and Labour Plan (SLP) was submitted as part of the MR application and will be further discussed in the DEIAR. The SLP forms the basis for the implementation of programmes and projects as key activity drivers of the development and operation of the mining activity in the Theunissen area. It offers the building blocks for future

economic development and growth of the local area. The scope of the document offers the Applicant a platform to engage in the development of the local economy and community through a basis of human resource development, economic delivery, business development and community participation. The nature of the document is therefore aimed at the widest possible comprehension and stimulation for inputs.

The SLP notes that the De Klerks Kraal Sand Mine proposed to have 16 employees who will support approximately 53 dependents (based on an average household size of 3.3). Since all the employees will reside within the Lejweleputswa area, it is fair to presume that most monthly earned salaries will be spend in the local area. Indirectly, through the payment for services and suppliers, the mine also supports employment of the procurement partners.

The SLP notes that, upon approval, the MR Holder intends to spend at least R 360 753.00 on Human Resource Development, and R 61 594.00 on Local Economic Development (LED) over a 5-year period. A Local Economic Development project is in the process of being identified in consultation with the Matjhabeng Local Municipality. In addition to the LED project, the mine will afford the employees, with an education level lower than ABET 4, the opportunity to become functionally literate as the intension of the mine is for all employees to obtain an education level of at least ABET level 4.

Portable skills training to be offered by the mine to employees will include at least the following:

- Basic electrical;
- Basic firefighting;
- Core business training (induction);
- First aid training;
- Health and safety training;
- Machine operator;
- Welding.

These skills will be expanded on by the training of employees in:

- Environmental awareness;
- HIV/AIDS awareness and healthy living programme;
- Introduction to environmental awareness;
- Introduction to firefighting;
- Introduction to health and safety in the workplace;

- Risk assessment training;
- Tuberculosis awareness training.

Additional contributions to be made by the mine includes (amongst others):

- Career progression plans;
- Learnerships and Artisan Training;
- Mentorship plan;
- Post matric programme where children from the community will be assisted in obtaining drivers licences;
- School support to children of employees.

SITE SPECIFIC EXISTING INFRASTRUCTURE

Apart from the mining infrastructure at the Blazecor mining area, no other infrastructure exists on the proposed mining footprint that could be affected by the proposed activity.

(d) Environmental and current land use map.

(Show all environmental, and current land use features)

The environmental and current land use maps are attached as Appendix D.

v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

The following potential impacts were identified of each main activity in each phase of the proposed project. The significance rating was determined using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact rating listed below was determined for each impact **prior** to bringing the proposed mitigation measures into consideration. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

SITE ESTABLISHMENT

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	5	1	2.3	5	5	5	**11.5**

Visual intrusion due to site establishment

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	2	2.6	5	5	5	**13**

Potential negative impact on the ESA and Broad-Scale Ecological Processes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	4	3	3.6	3	1	2	**7.2**

Loss of topsoil and fertility during site establishment

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	5	1	3	4	2	3	**9**

Infestation of the topsoil heaps and mining area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	4	2	3	4	2	3	**9**

Potential impact on terrestrial fauna within the footprint area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	4	2	3	4	2	3	**9**

Dust nuisance because of the site establishment activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	4	2	2.6	3	3	3	**7.8**

Noise nuisance because of the site establishment activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	2	2.6	1	5	3	**7.8**

Work opportunities to 16 local residents **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: N/A**	
1	4	5	3.3	5	5	5	**16.5**

WINNING OF SAND – FROM THE FLOODPLAIN/RIPARIAN AREA

Modification of geomorphology

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	1	3.3	5	5	5	**16.5**

Loss of some of the riparian vegetation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	1	3.3	5	5	5	**16.5**

Contributing towards increased sedimentation of the aquatic and riparian habitat

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	2	3.6	5	5	5	**18**

Causing local modification and de-stabilisation of the bank

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	1	3.3	5	5	5	**16.5**

Potential soil contamination from hydrocarbon- or other spills

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	4	4	4	4	3	3.5	**14**

Noise nuisance because of the mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	2	2.6	3	4	3.5	**9.1**

Potential impact on areas/infrastructure of heritage or cultural concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	5	5	4.6	1	1	1	**4.6**

Loss of mining equipment due to unexpected flooding

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	3	1	2.3	3	2	2.5	**5.8**

WINNING OF SAND – FROM THE RIVERBED

Modification of geomorphology

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
3	4	2	3	5	5	5	**15**

Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	4	4.3	5	5	5	**21.5**

Causing local modification of the bank

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	2	3.6	5	5	5	**18**

Potential impact on local and downstream water quality and -users

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	5	4.5	**19.4**

Loss of mining equipment due to unexpected flooding

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	3	1	2.3	3	2	2.5	**5.8**

Flooding of the area during large floods

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
3	3	2	2.6	4	1	2.5	**6.5**

Dust nuisance because of the mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	4	2	3	4	5	4.5	**13.5**

Noise nuisance because of the mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	2	2.6	2	5	3.5	**9.1**

Potential impact associated with littering and hydrocarbon spills

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	4	2	3	4	4	4	**12**

Infestation of denuded areas with invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	4	2	3	5	2	3.5	**10.5**

Deterioration of the access road to the mining area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	4	2	2.6	3	2	3.5	**9.1**

Overloading of trucks having an impact on the public roads

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	4	5	4.3	4	5	4.5	**19.4**

SLOPING AND LANDSCAPING (MEDIUM & LONG TERM)

Erosion of returned topsoil and/or riverbanks after rehabilitation

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	5	3	4	4	2	3	**12**

Residual impact on the flow regime of the Sand River

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
4	5	5	4.6	4	5	4.5	**20.7**

Infestation of the reinstated area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	4	2	3	5	2	3.5	**10.5**

Noise nuisance because of the decommissioning activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	1	2	1.3	1	5	3	**3.9**

Potential impact associated with litter/hydrocarbon spills left at the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	5	2	3.3	4	4	4	**13.2**

Return of the mined areas to agricultural use **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: N/A**	
1	5	5	3.7	5	5	5	**18.5**

CUMULATIVE IMPACTS

Increased sediment leads to the sedimentation of unique bedrock communities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	4	2	3.3	4	5	4.5	**14.9**

Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	4	4.3	4	5	4.5	**19.4**

Combined impact on the flow regime of the river

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
4	5	4	4.3	4	5	4.5	**19.4**

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined to decide the extent to which the initial site layout needs revision).

Methodology for the assessment of the potential environmental, social and cultural impacts

DEFINITIONS AND CONCEPTS:

Environmental significance:

The concept of significance is at the core of impact identification, evaluation, and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognized from the various interpretations:

- Environmental significance is a value judgment
- The degree of environmental significance depends on the nature of the impact
- The importance is rated in terms of both biophysical and socio-economic values
- Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e., intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e., level of acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of consequences being realized (Environment Australia (1999) Environmental Risk Management).

Impact

The positive or negative effects on human well-being and / or the environment.

Consequence

The intermediate or outcome of an event or situation OR it is the result, on the environment, of an event.

Likelihood

A qualitative term covering both probability and frequency.

Frequency

The number of occurrences of a defined event in each time or rate.

Probability

The likelihood of a specific outcome measured by the ratio of a specific outcome to the total number of possible outcomes.

Environment

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation (ISO 14004, 1996).

Methodology that will be used

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence X Overall Likelihood

Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information, and the outcome can be positive or negative. Several factors can be used to determine consequence. For determining the environmental significance in terms of consequence, the following factors were chosen ***Severity/Intensity, Duration and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables below.

Determination of Severity / Intensity

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

Table 1 will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 19: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

TYPE OF CRITERIA	RATING				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna, and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g., remedial action takes place.

Table 20: Criteria for the rating of duration.

RATING	DESCRIPTION
1	Up to one month
2	One month to three months (quarter)
3	Three months to one year
4	One to ten years
5	Beyond ten years

Determination of Extent/Spatial Scale

Extent or spatial scale is the area affected by the event, aspect, or impact.

Table 21: Criteria for the rating of extent / spatial scale.

RATING	DESCRIPTION
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighbouring farm area
5	Regional, National, International

Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarized below, and then dividing the sum by 3.

Table 22: Example of calculating overall consequence.

CONSEQUENCE	RATING
Severity	Example 4
Duration	Example 2
Extent	Example 4
SUBTOTAL	**10**
TOTAL CONSEQUENCE: (Subtotal divided by 3)	**3.3**

Determination of Likelihood:

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect, or impact, is undertaken.

Table 23: Criteria for the rating of frequency.

RATING	DESCRIPTION
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month
4	Once/more a Week
5	Daily

Determination of Probability

Probability refers to how often the activity or aspect has an impact on the environment.

Table 24: Criteria for the rating of probability.

RATING	DESCRIPTION
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarized below, and then dividing the sum by 2.

Table 25: Example of calculating overall likelihood.

CONSEQUENCE	RATING
Frequency	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD (Subtotal divided by 2)	**3**

Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH,** or **HIGH**, as shown in the table below.

Table 26: Determination of overall environmental significance.

SIGNIFICANCE OR RISK	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Overall Consequence x Overall Likelihood	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritizations and decision-making process associated with this event, aspect, or impact.

Table 27: Description of environmental significance and related action required.

SIGNIFICANCE	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Based on the above, the significance rating scale has been determined as follows:

High — Of the highest order possible within the bounds of impacts, which could occur. In the case of negative impacts, there would be no possible mitigation and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.

Medium-High — Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.

Medium — Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and easily possible. In case of positive impacts; other means of achieving these benefits would be about equal in time, cost, and effort.

Low-Medium — Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved of little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.

Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or several ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Site Alternative 1 (only viable site alternative)

Site Alternative 1 (S1) entails the mining of ±239 ha from Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231, within the boundaries of the GPS coordinates listed in Table 4. S1 was selected as the only viable- and preferred site alternative for the following reasons:

- The proposed footprint offers the Applicant access to the sand deposits on the properties;
- The proposed mining right footprint is an extension of the existing Blazecor mining permit area (4.8 ha) that has already proven the excellent quality and ample quantity of the sand resource;
- The Sand River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the river;
- The Applicant entered into access agreements with the landowners, as well as Blazecor (as lawful occupier of the property) who in principle support the proposed project;
- The proposed mining method and associated progressive rehabilitation of the mined areas will minimise the visual impact of the activities on the receiving environment.

Final Layout Alternative (FLA)

Following receipt of the specialist reports, the initial layout of the project was refined to accommodate their findings. This ultimately led to the Final Layout Alternative as proposed in this report. The FLA is deemed the preferred option as it accommodates the recommendations of both the WRA and the Aquatic Assessment. Should the FLA be implemented the proposed activity is deemed to be of moderate significance to the receiving environment.

No-go Alternative

The following matters were considered regarding the no-go alternative:

- Should the no-go option be implemented the MR Holder would not be able to mine the sand resources across the larger footprint. This will result in a direct loss of income to Vegablox (Pty) Ltd, and an indirect impact on the transport costs (increased) of clientele;
- The landowners will not receive compensation from the Applicant, and in doing so diversity their income generated from the properties;
- The proposed job opportunities and contributions required in terms of the SLP will be lost to the surrounding community;
- Neither the river channel, wetland conditions (marginal- and lower zones), or floodplain/riparian area will be impacted by sand mining as the agricultural use of these areas will continue.

Potential Negative Impacts associated with the Preferred Project Proposal (S1 & FLA)

The following table shows the potential negative impacts associated with the preferred project proposal that were identified during the EIA:

Table 28: List of potential negative impacts associated with the preferred project proposal.

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
❖ Site establishment	❖ Loss of agricultural land for duration of mining.	❖ Medium	❖ Low-Medium
❖ Site establishment	❖ Visual intrusion because of site establishment	❖ Mediuim	❖ Low-Medium
❖ Site establishment	❖ Potential negative impact on the ESA and Broad-Scale Ecological Processes.	❖ Low-Medium	❖ Low
❖ Site establishment ❖ Sloping and landscaping (Medium- & Long Term)	❖ Loss of topsoil and fertility during site establishment. ❖ Erosion of returned topsoil and/or riverbanks after rehabilitation	❖ Low-Medium ❖ Medium	❖ Low ❖ Low
❖ Site establishment ❖ Processing, stockpiling and transporting material from site ❖ Sloping and landscaping (Medium- & Long Term)	❖ Infestation of the topsoil heaps and mining area with invader plant species. ❖ Infestation of denuded areas with invader plant species. ❖ Infestation of the reinstated area with invader plant species.	❖ Low-Medium ❖ Medium ❖ Medium	❖ Low ❖ Low ❖ Low
❖ Site establishment	❖ Potential impact on terrestrial fauna within the footprint area	❖ Low-Medium	❖ Low

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
❖ Site establishment ❖ Processing, stockpiling and transporting material from site	❖ Dust nuisance because of site establishment activities. ❖ Dust nuisance because of the mining activities.	❖ Low-Medium ❖ Medium	❖ Low ❖ Low
❖ Site establishment ❖ Wining of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site ❖ Sloping and landscaping (Medium- & Long Term)	❖ Noise nuisance because of the site establishment activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the decommissioning activities.	❖ Low-Medium ❖ Low-Medium ❖ Low-Medium ❖ Low	❖ Low ❖ Low ❖ Low-Medium ❖ Low
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Modification of geomorphology ❖ Modification of geomorphology	❖ Medium-High ❖ Medium-High	❖ Medium ❖ Medium
❖ Winning of sand – from the floodplain/riparian area	❖ Loss of some of the riparian vegetation	❖ Medium-High	❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Cumulative impacts	❖ Contributing towards increased sedimentation of the aquatic and riparian habitat. ❖ Increased sediment leads to the sedimentation of unique bedrock communities. ❖ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community	❖ Medium-High ❖ Medium ❖ Medium-High	❖ Medium ❖ Low-Medium ❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Causing local modification and de-stabilisation of the bank ❖ Causing local modification of the bank	❖ Medium-High ❖ Medium-High	❖ Medium ❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site ❖ Sloping and landscaping (Medium- & Long Term)	❖ Potential soil contamination from hydrocarbon- or other spills ❖ Potential impact associated with littering and hydrocarbon spills ❖ Potential impact associated with litter/hydrocarbon spills left at the mining area	❖ Medium ❖ Medium ❖ Medium	❖ Low ❖ Low ❖ Low
❖ Winning of sand – from the floodplain/riparian area	❖ Potential impact on areas/infrastructure of heritage or cultural concern	❖ Low	❖ Low

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed ❖ Processing, stockpiling and transporting material from site	❖ Loss of mining equipment due to unexpected flooding ❖ Loss of mining equipment due to unexpected flooding ❖ Flooding of the area during large floods	❖ Low-Medium ❖ Low-Medium ❖ Low-Medium	❖ Low ❖ Low ❖ Low-Medium
❖ Winning of sand – from the riverbed	❖ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river	❖ High	❖ Medium
❖ Winning of sand – from the riverbed	❖ Potential impact on local and downstream water quality and -users	❖ Medium-High	❖ Low-Medium
❖ Processing, stockpiling and transporting material from site	❖ Deterioration of the access road to the mining area.	❖ Low-Medium	❖ Low
❖ Processing, stockpiling and transporting material from site	❖ Overloading of trucks having an impact on the public roads	❖ Medium-High	❖ Low
❖ Sloping and landscaping (Medium- & Long Term) ❖ Cumulative impact	❖ Residual impact on the flow regime of the Sand River. ❖ Combined impact on the flow regime of the river	❖ High ❖ Medium-High	❖ Low ❖ Medium

viii) The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment / discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

The following mitigation measures are proposed to address/minimize the potential impacts that the proposed activity may have on the surrounding environment.

VISUAL CHARACTERISTICS

Visual Mitigation:

- Operational areas may not exceed the proposed 6.5 ha (two 2.5 ha minor areas, and 1.5 ha for processing) at any given time.
- The site must have a neat appearance and be always kept in good condition.
- Mining equipment must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use.
- Concurrent rehabilitation must be done as mining progress to limit the visual impact on the aesthetic value of the area.

- The MR holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area.
- Upon closure the site must be rehabilitated and levelled to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.

GEOLOGY AND SOIL

Topsoil Management:

- The upper 300 mm of soil must be stripped and stockpiled before mining.
- Topsoil is a valuable and essential resource for rehabilitation, and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
- Topsoil stripping, stockpiling, and re-spreading must be done in a systematic way. The mining plan must be such that topsoil is stockpiled for the minimum possible time.
- The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.
- Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion.
- Topsoil heaps may not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- The temporary topsoil stockpiles must be kept free of invasive plant species.
- Storm- and runoff water must be diverted around the stockpile area to prevent erosion.
- The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site.
- The Applicant must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.
- A cover crop must be planted, irrigated, and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production, and any soil deficiencies must be corrected, based on a chemical analysis of the re-spread soil (if deemed necessary). It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.

- The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.

HYDROLOGY, GEOHYDROLOGY AND GROUNDCOVER (INCLUDING WETLANDS)

Mitigating the potential impact on the Sand River, Riparian Areas, and Downstream Users:

- The flow of the river may at no point be changed, dammed, or diverted without prior authorisation from the Department of Water and Sanitation (DWS).
- No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.
- The Applicant must always adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities.
- No equipment of any kind may be stored within the riverbed.
- A 38 m buffer must be established and maintained as no-go area around the river channel, wetland conditions (marginal- and lower zones), lateral streams, and backwater wetlands. The floodplain/riparian area mining, and processing area must be established outside the 38 m buffer area.
- Excavations must be limited to the mining of a maximum of two minor areas, supported by one processing area at any given time.
- Once an area is mined, it must be rehabilitated prior to the opening of a consecutive minor area.
- Only one sand pump, including infrastructure and access road, may be utilised at any time and the site must be rehabilitated immediately after moving the pump to another location along the site.
- The entrance point into the river must be carefully selected to minimise disturbance of the marginal zone and avoid the steep banks of the river. It must also be clearly demarcated to prevent sprawling.
- Any disturbance of the riverbank must be adequately rehabilitated which must include re-instatement of the natural topography, replacement of topsoil, prevention of erosion and monitoring and eradication of problematic weeds and invasives
- Where disturbance of the banks or floodplain takes place the removal of vegetation must be kept to a minimum.
- Prior to the clearing of any vegetation, an appropriately qualified specialist must conduct a walk-through inspection to identify any sensitive and/or protected plants that may have to be relocated before the area is mined. Special focus must be placed on species such as *Ammocharis coranica, Crinum bulbispermum, Kniphofia ensifolia*. If needed plant

relocation/destruction permits must be obtained from the relevant authorities and filed on site for auditing purposes.

- Adequate storm water management measures must be implemented and must include diverting storm- and floodwater around the stockpile and excavation areas and preventing sediment and silt from entering the river.
- Necessary precautions must be taken to ensure that floodwaters are diverted around the processing/stockpile- and excavation areas by means of berms.
- Rehabilitation must endeavour to re-instate a geomorphology which will form part of a functional system and must refrain from leaving open excavations or pits.
- A comprehensive monitoring programme must be followed to quantify impacts and recommend mitigation. Such monitoring must include quarterly water quality sampling, sediment release (turbidity), Index of Habitat Integrity and SASS5 or a combination thereof.
- Continued bi-annual monitoring of the habitat, macro-invertebrate, and fish communities at the reference sites, which vary seasonally.

Erosion Mitigation / Storm Water Control:

- The Stormwater Management Plan, appended to this document, must be implemented on site.
- Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion.
- Drainage must be controlled to ensure that runoff from the mining area does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points.
- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.
- Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
  - Clean water (e.g., rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
  - Dirty water must be collected and contained in a system separate from the clean water system.
  - Dirty water must be prevented from spilling or seeping into clean water systems.
  - A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).

- The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.

AIR AND NOISE AMBIANCE

Fugitive Dust Emission Mitigation:

- The liberation of dust into the surrounding environment must be effectively controlled using, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g., DAS products).
- The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust.
- Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.
- Loads must be flattened to prevent spillage of sand during transportation, also minimising windblown dust.
- Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.
- All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).
- Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from site to minimize potential dust impacts.

Noise Handling:

- The Applicant must ensure that the employees and visitors to the site conduct themselves in an acceptable manner while on site.
- No loud music may be permitted at the mining area.
- All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- Best practice measures shall be implemented to minimize potential noise impacts.
- A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.

Impacts on Ecological Support Area and Broad-Scale Ecological Processes:

- The mining boundaries must be clearly demarcated, and all operations must be contained to the approved mining area.
- The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly.
- An invasive plant species management plan must be implemented on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.
- The protection of the riverine ecology must be ensured as far as possible. If not possible, endangered and/or protected species (if present) must be transplanted in compliance with the legislation and permits for the translocation of species.

Management of Invasive Plant Species:

- An invasive plant species management plan must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.
- All stockpiles must be kept free of invasive plant species.
- Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
  - The plants can be uprooted, felled, or cut off and can be destroyed completely.
  - The plants can be treated chemically by a registered pest control officer (PCO) using an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.

FAUNA

Protection of Terrestrial Fauna:

- The site manager must ensure no fauna is caught, killed, harmed, sold, or played with.
- Any fauna directly threatened by the operational activities must be removed to a safe location by a competent person.
- All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Workers must be instructed to report any animals that may be trapped in the working area.

- No snares may be set, or nests raided for eggs or young.
- All vehicles must adhere to a low-speed limit (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises.
- No activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed).
- Any dangerous fauna (snakes, scorpions, etc.) that are encountered during construction must not be handled or antagonised by the construction staff. A suitably qualified person(s) must be contacted to remove the animals to safety.
- No litter, food or other foreign material must be thrown or left around the site and must be placed in demarcated rubbish and litter areas that are animal proof.
- Should any bats be noted in any of the mining areas, the opinion and guidance of a suitably qualified person must be obtained.
- The mining activities must be demarcated with beacons rather than being fenced off allow free movement of roaming species.
- Restrict all mining operations to daylight hours.

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects:

- All mining must be confined to the development footprint area.
- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA.
- Work may only continue once the go-ahead was issued by SAHRA.
- A Fossil Chance Find Procedure must be implemented for the project as listed below:
  - The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
  - When excavations begin the sand must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.

- Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are of good quality or scientific interest by the palaeontologist must be removed, catalogued, and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished, then no further monitoring is required.

LAND USE

Loss of agricultural land for duration of mining:

- The temporary loss of agricultural land for the duration of the mining period is acceptable to the landowner. If needed, mined/rehabilitated areas will revert to agricultural use once the cover crop stabilised.

EXISTING INFRASTRUCTURE

Access Road Mitigation:

- Storm water must be diverted around the access road to prevent erosion.
- Vehicular movement must be restricted to the existing access roads and crisscrossing of tracks through undisturbed areas must be prohibited.
- Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the Applicant.
- Overloading of the trucks must be prevented, and proof of load weights must be filed for auditing purposes.

Waste Management:

- Vehicle maintenance, repairs and services may only take place at the workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal.
- Ablution facilities must be provided to all employees. The toilet must be placed outside the 1:100-year floodline of the river.
- Ablution facilities must drain into a septic tank with closed system. No french drains may be installed on site.
- The ablution facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage. Any pollution problems arising from the above are to be addressed immediately by the Applicant.
- If a diesel bowser is used on site, it must be always equipped with a drip tray. Drip trays must be used during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.
- Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed to the hazardous waste storage area of the workshop, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.
- A waste management plan must be compiled by site management and implemented on site. The plan must focus on the waste hierarchy of the NEM:WA.
- General waste must be contained in marked, sealable, refuse bins placed at a designated area, to be removed when filled to a recognised general waste landfill site.
- No waste may be buried or burned on the site.
- It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.

Management of Health and Safety Risks:

- Adequate ablution facilities and water for human consumption must daily be available on site.
- Worker(s) must have access to the correct personal protection equipment (PPE) as required by law.
- All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).

ix) Motivation where no alternative sites were considered.

N/A

x) Statement motivating the alternative development location within the overall site.

(Provide a statement motivating the final site layout that is proposed)

As mentioned earlier, the environmental assessment considered the no-go alternative, site alternative, and various layout alternatives upon receipt of the site-specific information, comments received from the public, and the results of the specialist studies. S1 is deemed the only viable site alternative as the proposed area extends across the entire riverfront of Portion 0 and 1 of the farm De Klerks Kraal No 231. The application area cannot be moved to the east, west, north, or south for reasons as explained earlier. The FLA is deemed the preferred option as it accommodates the recommendations of both the WRA and the Aquatic Assessment. Should the FLA be implemented the proposed activity is deemed to be of moderate significance to the receiving environment.

Please refer to Part A(1)(g) *Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site*; as well as Part A(1)(g)(i) *Details of the development footprint alternatives considered* for a discussion regarding the matters that were considered when determining the preferred development option within the overall site.

h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) 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).

During the impact assessment process, the following potential impacts were identified of each main activity in each phase. An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site.

The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment. The significance rating was again determined for each impact associated with the identified alternatives using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

SITE ESTABLISHMENT

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	3	1	1.6	4	5	4.5	**7.2**

Visual intrusion because of site establishment

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	3	2	2	3	2	2.5	**5**

Potential negative impact on the ESA and Broad-Scale Ecological Processes

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	3	3	2.6	2	1	1.5	**3.9**

Loss of topsoil and fertility during site establishment

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	2	1	2	2	1	1.5	**3**

Infestation of the topsoil heaps and mining area with invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	2	1	1.6	3	2	2.5	**4**

Potential impact on terrestrial fauna within the footprint area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	2	1	1.6	2	2	2	**3.2**

Dust nuisance because of the site establishment activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
1	1	1	1	3	3	3	**3**

Noise nuisance because of the site establishment activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	1	2	1.3	1	5	3	**3.9**

Work opportunities to 16 local residents **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: N/A**	
1	4	5	3.3	5	5	5	**16.5**

WINNING OF SAND – FROM THE FLOODPLAIN/RIPARIAN AREA

Modification of geomorphology

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	1	2.3	5	5	5	**11.5**

Loss of some of the riparian vegetation

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	1	2.3	5	4	4.5	**10.4**

Contributing towards increased sedimentation of the aquatic and riparian habitat

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	2	2.6	4	4	4	**10.4**

Causing local modification and de-stabilisation of the bank

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	1	2.3	4	5	4.5	**10.4**

Potential soil contamination from hydrocarbon- or other spills

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	1	1.3	3	2	2.5	**3.3**

Noise nuisance because of the mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	4	2	2.3	2	2	2	**4.6**

Potential impact on areas/infrastructure of heritage or cultural concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	5	5	4.3	1	1	1	**4.3**

Loss of mining equipment due to unexpected flooding

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	3	1	2	3	1	2	**4**

WINNING OF SAND – FROM THE RIVERBED

Modification of geomorphology

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	2	2.6	5	5	5	**13**

Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	4	3.3	4	5	4.5	**14.9**

Causing local modification of the bank

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
2	4	1	2.3	4	5	4.5	**10.4**

Potential impact on local and downstream water quality and -users

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	3	2	2.3	3	2	2.5	**5.8**

Loss of mining equipment due to unexpected flooding

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	3	1	2	3	1	2	**4**

PROCESSING, STOCKPILING AND TRANSPORTING MATERIAL FROM SITE

Flooding of the area during large floods

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
3	3	2	2.6	3	1	2	**5.2**

Dust nuisance because of the mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	2	1.6	2	2	2	**3.2**

Noise nuisance because of the mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	4	1	2	2	3	2.5	**5**

Potential impact associated with littering and hydrocarbon spills

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	1	1.3	2	2	2	**2.6**

Infestation of denuded areas with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	2	1	1.6	2	2	2	**3.2**

Deterioration of the access road to the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	3	2	2.3	2	1	1.5	**3.5**

Overloading of trucks having an impact on the public roads

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	5	2.6	2	1	1.5	**3.9**

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

Erosion of returned topsoil and/or riverbanks after rehabilitation

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	1	1.3	2	2	2	**2.6**

Residual impact on the flow regime of the Sand River

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
3	1	2	2	2	2	2	**4**

Infestation of the reinstated area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	1	1.3	2	2	2	**2.6**

Noise nuisance because of the decommissioning activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
1	1	2	1.3	1	4	2.5	**3.3**

Potential impact associated with litter/hydrocarbon spills left at the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Full**	
2	1	1	1.3	2	1	1.5	**2**

Return of the mined areas to agricultural use **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: N/A**	
1	5	5	3.7	5	5	5	**18.5**

CUMULATIVE IMPACTS

Increased sediment leads to the sedimentation of unique bedrock communities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
3	3	2	2.6	3	3	3	**7.8**

Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
3	4	4	3.6	3	3	3	**10.8**

Combined impact on the flow regime of the river

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1 & Final Layout Alternative**			**Degree of Mitigation: Partial**	
3	4	4	3.6	3	3	3	**10.8**

i) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table 29: Assessment of each identified potentially significant impact and risk.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, air pollution, etc…etc…etc.)		In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	If not mitigated.	(modify, remedy, control, or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc etc) E.g. Modify through alternative method Control through noise control Control through management and monitoring through rehabilitation.	If mitigated.
❖ Demarcation of the minor areas with visible beacons.	❖ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	N/A	<u>Control:</u> Implementation of proper housekeeping and site management.	N/A
❖ Site establishment	❖ Loss of agricultural land for duration of mining.	The impact may affect the agricultural operations of the property.	Site Establishment- & Operational Phase	❖ Medium	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The	❖ Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
					impact could be controlled through progressive rehabilitation.	
❖ Site establishment	❖ Visual intrusion because of site establishment.	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	❖ Medium	Control: Proper housekeeping and implementation of progressive rehabilitation.	❖ Low-Medium
❖ Site establishment	❖ Potential negative impact on the ESA and Broad-Scale Ecological Processes.	This may impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	❖ Low-Medium	Control: Implementing the proposed mitigation measures and mining only two minor areas at a time.	❖ Low
❖ Site establishment ❖ Sloping and landscaping (medium- & long term).	❖ Loss of topsoil and fertility during site establishment. ❖ Erosion of returned topsoil and/or riverbanks after rehabilitation.	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment- & Operational Phase	❖ Low-Medium ❖ Medium	Control & Remedy: Proper housekeeping and storm water management.	❖ Low ❖ Low
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	❖ Infestation of the topsoil heaps and mining area with invader plant species. ❖ Infestation of the denuded areas with invader plant species. ❖ Infestation of the reinstated area with invader plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational-, and Decommissioning Phase	❖ Low-Medium ❖ Medium ❖ Medium	Control: Implementing soil- and invader plant control/management.	❖ Low ❖ Low ❖ Low
❖ Site establishment.	❖ Potential impact on terrestrial fauna within the footprint area.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	❖ Low-Medium	Control & Stop: Implementing good management practices and the proposed mitigation measures.	❖ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site.	❖ Dust nuisance because of the site establishment activities. ❖ Dust nuisance because of the mining activities.	Increased dust will impact on the air quality of the receiving environment.	Site Establishment- & Operational Phase	❖ Low-Medium ❖ Medium	Control: Dust suppression methods and proper housekeeping.	❖ Low ❖ Low
❖ Site establishment. ❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	❖ Noise nuisance because of the site establishment activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the decommissioning activities.	Should the noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment- and, Operational Phase	❖ Low-Medium ❖ Low-Medium ❖ Low-Medium ❖ Low	Control: Noise suppression methods and proper housekeeping.	❖ Low ❖ Low ❖ Low-Medium ❖ Low
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Modification of geomorphology ❖ Modification of geomorphology	A change in geomorphology of the river could affect the flow regime and associated water users (fauna, flora, and human)	Operational Phase	❖ Medium-High ❖ Medium-High	Control & Remedy: Implementing the proposed mitigation measures as well as progressive rehablitation.	❖ Medium ❖ Medium
❖ Winning of sand – from the floodplain/riparian area	❖ Loss of some of the riparian vegetation	Denuded areas can lead to erosion and sedimentation of the river	Operational Phase	❖ Medium-High	Control: Implementing the proposed mitigation measures and mining of only two minor areas at a time.	❖ Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
❖ Winning of sand – from the floodplain/riparian area ❖ Cumulative Impacts	❖ Contributing towards increased sedimentation of the aquatic and riparian habitat ❖ Increased sediment leads to the sedimentation of unique bedrock communities ❖ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community	Increased sedimentation of the river could have a negative impact on unique bedrock communities, as well as a decrease in instream and marginal macrophytes and aquatic communities.	Operational Phase	❖ Medium-High ❖ Medium ❖ Medium-High	Control & Stop: Through the proosed mitigation measures and continuous aquatic health monitoring.	❖ Medium ❖ Medium-Low ❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Causing local modification and de-stabilisation of the bank ❖ Causing local modification and de-stabilisation of the bank	Altering the banks of the river could affect the entire flow regime.	Operational Phase	❖ Medium-High ❖ Medium-High	Control & Stop: Through the proosed mitigation measures and proper stormwater control.	❖ Medium ❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscapting (medium- & long terrm).	❖ Potential soil contamination from hydrocarbon- and other spills. ❖ Potential impact associated with littering and hydrocarbon spills. ❖ Potential impact associated with	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the MR Holder.	Operational-, and Decommissioning Phase	❖ Medium ❖ Medium ❖ Medium	Control & Remedy: Proper housekeeping and implementation of an emergency response plan and waste management plan.	❖ Low ❖ Low ❖ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	litter/hydrocarbon spills left at the mining area.	.				
❖ Winning of sand – from the floodplain/riparian area.	❖ Potential impact on areas/infrastructure of heritage or cultural concern.	The impact could affect the cultural sense and/or artefacts of the area.	Site Establishment- and, Operational Phase	❖ Low	Control & Stop: Implementation of a chance-find procedure.	❖ Low
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed ❖ Processing, stockpiling and transporting material from site.	❖ Loss of mining equipment due to unexpected flooding. ❖ Loss of mining equipment due to unexpected flooding ❖ Flooding of the area during large floods	This impact could result in financial losses to the sand mine.	Operational Phase	❖ Low-Medium ❖ Low-Medium ❖ Low-Medium	Control: Implementing the proposed mitigation measures.	❖ Low ❖ Low ❖ Low
❖ Winning of sand – from the riverbed ❖ Sloping and landscapting (medium- & long terrm) ❖ Cumulative Impacts	❖ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river ❖ Residual impact on the flow regime of the Sand River ❖ Combined impact on the flow regime of the river	This impact could affect the hydrology and downstream water users.	Operational Phase	❖ High ❖ High ❖ Medium-High	Control & Modify: Implementation of the proposed mitigation measures and continuous aquatic health monitoring.	❖ Medium ❖ Low ❖ Medium
❖ Winning of sand – from the riverbed	❖ Potential impact on local and downstream water quality and – users.	This impact could affect the hydrology and downstream water users.	Operational Phase	❖ Medium-High	Control: Implementing the proposed mitigation measures and keeping mining operations to the approved boundaries.	❖ Low-Medium)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
❖ Processing, stockpiling and transporting material from site.	❖ Deterioration of the access road to the mining area. ❖ Overloading of trucks having an impact on the public roads.	Impacting the condition of public roads may incur public complaints and additional costs to the MR Holder.	Operational Phase	❖ Low-Medium ❖ Medium-High	Control & Remedy: Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	❖ Low ❖ Low

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix M.

j) Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):

Table 30: Summary of specialist reports.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Wetland and Riparian Assessment for sand mining operations along the banks of the Sand River on the Farm De Klerkskraal situated near Theunissen, Free State Province. April 2022 *(See Appendix G for a full copy of the document)*	Recommendations: The main channel of the Sand River, wetland conditions along the banks, lateral stream systems and floodplain wetland areas are all regarded as having a very high sensitivity and should wherever possible, be excluded from mining operations. ❖ A 38-meter buffer zone around these areas is also regarded as having a high sensitivity and should also be excluded from operations. ❖ Mining operations should aim to avoid all areas regarded as having a very high and high level of sensitivity, while focussing operations in areas with moderate sensitivity.	All the recommendations of the specialist were incorporated into this document.	Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.2 Clearing of Vegetation. Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Hydrology, Geohydrology and Groundcover (including wetlands). Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Hydrology, Geohydrology

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	❖ This may however not be possible where sand excavation takes place from the lower zone or banks of the river and where sand is pumped from the main channel. In such instances, the operational area (stockpile area, sand screen, settling dams and all other associated structures and infrastructure) should at least be located outside these areas of high sensitivity. ❖ The backwater floodplain wetlands and lateral stream systems do not contain sand resources and would not be desirable for mining. They should therefore be excluded from any mining operations or activities and treated as no-go areas. The exotic species occurring on the site must be eradicated as mining progresses. It is also recommended that the eradication of exotic species be rigidly maintained and form part of the management of the mining process. The following mitigation measures are recommended where mining activities will impact on the Sand River or its floodplain: ❖ The sand excavation areas should be limited to an extent of 5 hectares at a time. Sand should be excavated, processed and the area rehabilitated before moving to a new sand mining area. ❖ Only one pump, including infrastructure and access road, should be utilised at any time and the site rehabilitated immediately after moving the pump to another location along the site. ❖ Any disturbance of the riverbank should be adequately rehabilitated which must include re-instatement of the natural topography, replacement of topsoil, prevention of		and Groundcover (including wetlands). Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Hydrology, Geohydrology and Groundcover (including wetlands). Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	erosion and monitoring and eradication of problematic weeds and invasives. ❖ Where disturbance of the banks or floodplain takes place the removal of vegetation must be kept to a minimum. ❖ Implementing consecutive rehabilitation to preserve the integrity of the system. ❖ Keeping disturbance of the marginal zone and steep banks of the river to a minimum. ❖ The stockpile area is situated within the floodplain and requires the removal of vegetation. Where disturbance of the soil surface will occur, the topsoil should first be removed and stored on site and should be utilised once rehabilitation of the site takes place. ❖ Adequate storm water management measures should be implemented and should include diverting storm- and floodwater around the stockpile and excavation areas and preventing sediment and silt from entering the river. ❖ As the stockpile areas and several of the sand excavation areas are in the floodplain and along the riverbanks they will also be affected by annual flooding and the necessary precautions should therefore be taken to ensure that floodwaters are diverted around them by means of berms. ❖ Where excavation of sand takes place within the floodplain and along the riverbanks the rehabilitation should endeavour to re-instate a geomorphology which will form part of a functional system and should refrain from leaving excavations or pits. ❖ Due to the high abundance of exotic weeds currently on the site it will be difficult to keep the site weed-free. Seeding of bare areas with indigenous pioneer grasses should be considered as this will provide competition for exotic species.		

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	The hunting, capturing, and trapping of fauna should be prevented by making this a punishable offense during the mining operations. No littering must be allowed, and all litter must be removed from the site. Monitoring of mining and compliance with recommended mitigation measures must take place. After mining has ceased all construction materials should be removed from the area. Comprehensive rehabilitation should be undertaken after mining has ceased. This should include re-instatement of the natural topography as far as possible, replacing topsoil in disturbed areas, prevention of erosion and monitoring and eradication of exotic invasive species. The proposed mining operations will result in significant impacts on the banks and main channel of the river. A comprehensive monitoring programme should therefore be followed to quantify impacts and recommend mitigation. Such monitoring should include quarterly water quality sampling, sediment release (turbidity), Index of Habitat Integrity and SASS5 or a combination thereof. Mining operations within 100 meters or within the floodplain of the river and within 500 meters of wetland areas will require authorisation from DWS.		

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Specialist Aquatic Assessment (Baseline Study) March 2022 *(See Appendix H for a full copy of the assessment).*	**Possible Mitigation Measures:** Possible mitigation measures towards future impacts from the sand mine development on the freshwater biota are given below: ❖ The extent of the sand mining area should be limited to minimise environmental damage. ❖ The extraction of river sand should be conducted sustainably and must not compromise the flow of the river or divert the main flow of the river. ❖ Monitor in-situ water quality (including turbidity) upstream and downstream of the mine extent monthly during extraction activities. ❖ All rehabilitation and monitoring measures must ensure that disturbed areas are rehabilitated to pre-mining conditions. **Recommendations:** ❖ Continued bi-annual monitoring of the habitat, macro-invertebrate, and fish communities at these sites, which vary seasonally. ❖ Monitor siltation within the river segment downstream of activities. Implementation of a chance find procedure for the project.	All the recommendations proposed by the specialist were incorporated into this report, except that the frequency of water quality monitoring was aligned with the standard requirements of DWS. This report therefore proposes that monitoring be done biannually to reflect the upstream and downstream water quality of the river during the dry- and wet seasons.	Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.2 Clearing of Vegetation. Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Hydrology, Geohydrology and Groundcover (including wetlands). Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Hydrology, Geohydrology and Groundcover (including wetlands). Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Hydrology, Geohydrology and Groundcover (including wetlands).
Heritage Impact Assessment (inclusive of the desktop Palaeontological Impact Assessment)	**Recommendations for Condition of Authorisation:** The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:	All the recommendations proposed by the specialist were incorporated into this report.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Cultural and Heritage Environment.

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For the proposed mining right over Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231, Theunissen Municipal District, Free State Province. February 2022 *(See Appendix J for a full copy of the assessment).*	**Recommendations:** ❖ Implementation of a chance find procedure for the project (as outlined in Section 10.2). **<u>Chance Find Procedures</u>** **Heritage Resources:** The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines for this procedure are provided in Section 10.5. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below. ❖ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this		Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1)(g)-(k) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ❖ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ❖ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. **Chance find protocol for Paleontology – to commence once the excavations / mining activities begin.** 1. The following procedure is only required if fossils are seen on the surface and when mining commences. 2. When excavations begin the sand must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted. 3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 6). This information will be built into the EMP's training and awareness plan and procedures.		

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	4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. 5. If there is any possible fossil material found by the environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. 6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. 7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. 8. If no fossils are found and the excavations have finished then no further monitoring is required.		

k) Environmental impact statement

i) Summary of the key findings of the environmental impact assessment.

The key findings of the environmental impact assessment regarding the proposed Vengablox sand mining operation entail the following:

Project Proposal:

Vegablox (Pty) Ltd submitted a mining right application to mine sand from ±239 ha that extends over Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231 RD. The Applicant will divide the major area into minor areas of ±2.5 ha each. No more than two (2) minor areas will be mined at a time. In addition to the proposed 2.5 ha minor areas, the Applicant will have a designated processing- and stockpiling area (1.5 ha) where the mined material will be screened and washed prior to being stockpiled and transported to clients. Once a minor area is mined the area will be rehabilitated prior to the opening of the next minor area. One sand pump (at a time) will also be used to mine sand from the riverbed.

Topography:

The proposed activity will impact the topography of the earmarked footprint in that the virgin soil level of the floodplain/riparian area will be reduced as simulated in Figure 5. The depth of the mining activities will be limited to ±300 mm above the groundwater table.

Visual Characteristics:

The proposed footprint will mainly be visible from immediate surrounding areas. From the viewshed analysis it is shown that the visual impact of the earmarked footprint will be of medium significance without mitigation. The small scale of the proposed operation, and the proposed progressive rehabilitation, will however assist in mitigating the visual impact of the proposed development on the surrounding environment. No residual visual impact is expected upon closure of the mine.

Air Quality:

The current activities on the property and surrounding environment already impact the air quality and noise ambiance of the study area. Should the mining

right be approved, it is expected that the mining operation will generate approximately the same noise levels as the current sand mining operation. Due to the small scale of the operation the noise levels and potential dust impact to be generated at the mine is deemed to be of low significance to the surrounding environment.

Geology:

The study area is situated on geology associated with the Volksrust Formation. The Volksrust Formation of the Ecca Group in the vicinity of Theunissen is dominated by underlying mudrock. However, the site and surroundings are dominated by quite deep alluvial deposits consisting of fine sand and silt soils.

Hydrology, Geohydrology and Groundcover (including wetlands):

The study area is located at the Sand River that falls within quaternary catchment C42L, which forms part of the Middle Vaal Catchment (Sand/Vet sub water management area). The main channel, banks, and floodplain of the Sand River, which forms the main study area, is largely still intact and natural. The surface water runoff in the area is not significantly high. As a result, wetlands are uncommon in the area although several wetland areas are associated with the floodplain of the Sand River and the drainage lines and seasonal streams transecting the floodplain of the river.

In terms of the chemical water quality parameters the water within Sand River seem to fall within the excepted standards. High bacteriological values indicate that the water is not suitable for consumption but do not pose a significant risk for full contact recreation. High levels of turbidity during the current sampling may be a result of the recent flooding of the river. The Sand River has an Instream IHI of category C: Moderately Modified and Riparian IHI of category C: Moderately Modified. This is largely due to the change in flooding regime and disturbance/transformation of the habitat. The system should still be regarded as sensitive with a very high conservation value and mining should endeavour to keep impacts on it to a minimum.

The results of the WET-Health of the floodplain wetlands indicated an overall PES of Category B: Largely Natural, largely natural with few modifications. The EI&S of the floodplains associated with the Sand River has been rated as being Moderate: Floodplains that are ecologically important and sensitive on a

provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. The riparian habitat associated with the river does not have a significant diversity of species. It is considered unlikely that the site will provide a significant feeding or migratory site for wetland species. The ecological integrity of the river is moderate as it has been affected by several upstream impacts.

The specialist determined that a buffer of 38 m from the edge of the floodplain wetland areas and the wetland conditions along the Sand River main channel and lateral stream systems must be maintained. The portions of the floodplain outside this 38-meter buffer are still regarded as having a moderate sensitivity but impacts here will be more easily manageable. As a result, mining operations, except for one sand pump and associated access, should aim to avoid all areas regarded as having a very high and high level of sensitivity, while focussing operations in areas with moderate sensitivity. The risk of the proposed activity, in accordance with the proposed mitigation measures, is anticipated to remain moderate.

No rare or endangered species were encountered in the area. A few protected species had been observed in the surrounding areas and may also be likely to occur on the site. These include *Ammocharis coranica, Kniphofia ensifolia* and *Crinum bulbispermum*.

The Aquatic Assessment classified the riparian and instream habitats as being largely modified (D) for all the sites sampled. The macro-invertebrate integrity was calculated to be largely modified (D) for all sites. The ASPT scores indicated the family diversity mainly consisted of tolerant species resulting in all three sites to be classified as largely modified (D). The MIRAI score and EC of the current study showed that all sites were largely modified (D), compared to reference conditions. None of the macro-invertebrates sampled were sensitive. The PES for the sites sampled was largely modified (D). The aquatic habitats were impacted due to general catchment activities including upstream agricultural and anthropogenic activities and weirs that induced modifications to flow regime, in-stream channel, and water quality. The study area does not fall within a Freshwater Ecological Protected Area (FEPA). The possible impacts associated with the project will influence the water quality and biotic integrity of the system (if not mitigated) and therefore need to be continuously monitored to limit any adverse effects.

Terrestrial Fauna:

Natural occurring faunal species are sparse because of human activities in the general areas. No resident faunal species of conservation concern were identified within the proposed mining area. The avifauna co-exist with the existing sand mine, as all bird species are highly mobile and can readily move away from disturbance. Considering the adaptability shown by the animals to changes in their environment, it is proposed that should future mining activities be confined to a maximum of two minor areas at a time (maximum of 5 ha) supported by one processing area (1.5 ha), and progressive rehabilitation, the faunal component of the area would be able to adapt to the changes. Free movement of roaming species in and out of the work areas must be allowed, and activities must be restricted to daylight hours.

Cultural and Heritage Environment:

No heritage sites of significance occur within the impact area (including palaeontology) and no adverse impact to heritage resources is expected.

Socio-economic Environment:

The proposed mine will create approximately 16 employment opportunities to locals. The Applicant intends to spend at least R 360 753.00 on Human Resource Development, and R 61 594.00 on Local Economic Development (LED) over a 5-year period. In addition to the LED project, the mine will afford the employees, with an education level lower than ABET 4, the opportunity to become functionally literate.

Existing Infrastructure:

Apart from the mining infrastructure at the Blazecor mining area, no other infrastructure exists on the proposed mining footprint that could be affected by the proposed activity.

ii) Finale Site Map

Provide a map at an appropriate scale, which superimposes the proposed overall activity and its associated structure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers Attach as **Appendix**

See the map showing the site activities attached as Appendix C.

iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

The positive impacts associated with the proposed sand mining activity include the following:

- The proposed footprint offers the Applicant access to the sand deposits on the properties;
- The proposed mining right footprint is an extension of the existing Blazecor mining permit area (4.8 ha) that has already proven the excellent quality and ample quantity of the sand resource;
- The Sand River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the river;
- The Applicant entered into access agreements with the landowners, as well as Blazecor (as lawful occupier of the property) who in principle support the proposed project;
- The proposed mining method and associated progressive rehabilitation of the mined areas will minimise the visual impact of the activities on the receiving environment.
- The project will create ±16 employment opportunities to local residents.
- In terms of the SLP the Applicant has an obligation to contribute to Human Resource Development and the LED that further supports the development of the local socio-economic environment.

The following table shows the potential negative impacts associated with the proposed activity that were deemed to have a Low-Medium or higher significance/risk:

Table 31: List of potential impacts deemed to have a low-medium or higher significance/risk.

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
❖ Site establishment	❖ Loss of agricultural land for duration of mining.	❖ Medium	❖ Low-Medium
❖ Site establishment	❖ Visual intrusion because of site establishment	❖ Mediuim	❖ Low-Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Modification of geomorphology ❖ Modification of geomorphology	❖ Medium-High ❖ Medium-High	❖ Medium ❖ Medium

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
❖ Winning of sand – from the floodplain/riparian area	❖ Loss of some of the riparian vegetation	❖ Medium-High	❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Cumulative impacts	❖ Contributing towards increased sedimentation of the aquatic and riparian habitat. ❖ Increased sediment leads to the sedimentation of unique bedrock communities. ❖ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community	❖ Medium-High ❖ Medium ❖ Medium-High	❖ Medium ❖ Low-Medium ❖ Medium
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Causing local modification and de-stabilisation of the bank ❖ Causing local modification of the bank	❖ Medium-High ❖ Medium-High	❖ Medium ❖ Medium
❖ Processing, stockpiling and transporting material from site	❖ Flooding of the area during large floods	❖ Low-Medium	❖ Low-Medium
❖ Winning of sand – from the riverbed	❖ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river	❖ High	❖ Medium
❖ Winning of sand – from the riverbed	❖ Potential impact on local and downstream water quality and -users	❖ Medium-High	❖ Low-Medium
❖ Cumulative impact	❖ Combined impact on the flow regime of the river	❖ Medium-High	❖ Medium

l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPR as well as for inclusion as conditions of authorization.

Table 32: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
TOPOGRAPHY Landscaping of Mining Area	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Implement progressive rehabilitation as prescribed in the closure plan, appended to this document, through-out the operational- and decommissioning phases of the project.	❖ Effectively restoring the mining area to prevent residual impacts and allow for the proposed agricultural end-use.
VISUAL CHARACTERISTICS Visual Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Do not exceed the proposed 6.5 ha (two 2.5 ha minor areas, and 1.5 ha for processing) operational areas at any given time. ❖ Ensure that the site have a neat appearance and is always kept in good condition. ❖ Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. ❖ Implement concurrent rehabilitation as mining progress to limit the visual impact on the aesthetic value of the area. ❖ Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area. ❖ Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	❖ Minimise the impact of the mining operations on the visual characteristics of the receiving environment during the operational phase and minimise the residual impact after closure.
AIR QUALITY AND NOISE AMBIANCE Dust Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	❖ Control the liberation of dust into the surrounding environment using; inter alia, water spraying and/or other dust-allaying agents. ❖ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. ❖ Limit speed on the access roads to 40 km/h to prevent the generation of excess dust.	❖ Dust prevention measures are applied to minimise the generation of dust.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
	Compliance to be monitored by the Environmental Control Officer. Occupational Hygienist to report on the air quality of the mine.	❖ Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. ❖ Flatten loads to prevent spillage and windblown dust during transportation. ❖ Consider weather conditions upon commencement of daily operations. Limit operations during very windy periods. ❖ Ensure dust-generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). ❖ Implement best practice measures during the stripping of topsoil, loading, and transporting of the mineral from the site to minimize potential dust impacts.	
AIR QUALITY AND NOISE AMBIANCE Noise Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer. Occupational Hygienist to report on the noise levels of the mine.	❖ Ensure that employee and visitors to the site conduct themselves in an acceptable manner while on site. ❖ Do not permit loud music at the mining area. ❖ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. ❖ Implement best practice measures to minimise potential noise impacts. ❖ Appoint a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be done in accordance with the SANS10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.	❖ Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.
GEOLOGY AND SOIL Topsoil Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Strip and stockpile the upper 300 mm of the soil before mining. ❖ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. ❖ Ensure topsoil stripping, stockpiling, and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time.	❖ Adequate fertile topsoil is available to rehabilitate the mining area.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		❖ Place the topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas. ❖ Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establish plants (weeds or a cover crop) on the stockpiles to prevent erosion. ❖ Ensure that topsoil heaps do not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ❖ Keep temporary topsoil stockpiles free of invasive plant species. ❖ Divert storm- and runoff water around the stockpile area to prevent erosion. ❖ Spread the topsoil evenly, to a depth of 300 m, over the rehabilitated area upon closure of the site. ❖ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. ❖ Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum production. Rehabilitation extends until the first cover crop is well established. ❖ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	
HYDROLOGY, GEOHYDROLOGY AND GROUNDCOVER (INCLUDING WETLANDS) Mitigating the impact on the Sand River, Riparian Areas, and Downstream Users.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Do not change, dam, or divert the flow of the river without prior authorisation from the Department of Water and Sanitation (DWS). ❖ Do not allow activities to take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. ❖ Always adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities.	❖ Impact to the environment caused by storm water discharge is avoided and erosion is managed.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		❖ Do not store any equipment within the riverbed. ❖ Establish a 38 m buffer and maintain as no-go area around the river channel, wetland conditions (marginal- and lower zones), lateral streams, and backwater wetlands. Floodplain/riparian area mining, and processing must be established outside the 38 m buffer area. ❖ Limit excavations to the mining of a maximum of two minor areas, supported by one processing area at any given time. ❖ Once an area is mined, rehabilitate it prior to the opening of a consecutive minor area. ❖ Only use one sand pump, including infrastructure and access road, at any time and rehabilitate the area immediately after moving the pump to another location along the site. ❖ Carefully select the entrance point into the river to minimise disturbance of the marginal zone and avoid the steep banks of the river. Clearly demarcate the entrance to prevent sprawling. ❖ Adequately rehabilitate, including re-instatement of the natural topography, replacement of topsoil, prevention of erosion and monitoring and eradication of problematic weeds and invasives, any disturbance of the riverbank. ❖ Keep the removal of vegetation to a minimum where disturbance of the banks or floodplain takes place. ❖ Arrange that an appropriately qualified specialist conduct a walk-through inspection to identify any sensitive and/or protected plants that may have to be relocated before any vegetation is removed. Special focus must be placed on species such as *Ammocharis coranica, Crinum bulbispermum, Kniphofia ensifolia*. If needed, apply for plant relocation/destruction permits, and filed on site for auditing purposes. ❖ Implement adequate storm water management measures including diverting storm- and floodwater around the stockpile and excavation areas and preventing sediment and silt from entering the river.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		❖ Take necessary precautions to ensure that floodwaters are diverted around the processing/stockpile- and excavation areas by means of berms. ❖ Endeavour to re-instate a geomorphology which will form part of a functional system and refrain from leaving open excavations or pits upon rehabilitation. ❖ Follow a comprehensive monitoring programme to quantify impacts and recommend mitigation. Such monitoring must include quarterly water quality sampling, sediment release (turbidity), Index of Habitat Integrity and SASS5 or a combination thereof. ❖ Implement continued bi-annual monitoring of the habitat, macro-invertebrate, and fish communities at the reference sites, which vary seasonally.	
HYDROLOGY, GEOHYDROLOGY AND GROUNDCOVER (INCLUDING WETLANDS) Erosion Control and Storm Water Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Implement the Stormwater Management Plan, appended to this document. ❖ Divert storm water around the topsoil heaps and mining areas to prevent erosion. ❖ Control all drainage from the project area to prevent off-site pollution, flooding, or damage to infrastructure downstream of any storm water discharge points. ❖ Use silt traps where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas. ❖ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	❖ Impact to the environment caused by storm water discharge is avoided and erosion is managed.
MINING, BIODIVERSITY AND GROUNDCOVER Impacts on Ecological Support Area and Broad-Scale Ecological Processes.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ❖ Declare the area outside the mining boundaries a no-go area and educate all employees accordingly. ❖ Implement an invasive plant species management plan n site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.	❖ Vegetation clearing is restricted to the authorised development footprint of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		❖ Ensure the protection of the riverine ecology as far as possible. If not possible, transplant the endangered and/or protected species (if present) in compliance with the legislation and permits for the translocation of species.	
MINING, BIODIVERSITY AND GROUNDCOVER Management of Invasive Plant Species	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Implement an invasive plant species management plan at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA, 2004. Do weed/alien clearing on an ongoing basis throughout the life of the mining activities. ❖ Keep all stockpiles free of invasive plant species. ❖ Control declared invader or exotic species on the rehabilitated areas.	❖ Mining area is kept free of invasive plant species.
TERRESTRIAL FAUNA Protection of Fauna	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Ensure no fauna is caught, killed, harmed, sold, or played with. ❖ Remove any fauna directly threatened by the operational activities to a safe location. ❖ Provide environmental induction to all personnel regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers to report any animals that may be trapped in the working area. ❖ Prevent the setting of snares or raiding of nests for eggs or young. ❖ Restrict the speed of all vehicles (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. ❖ Prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ❖ Do not handle or antagonise any dangerous fauna (snakes, scorpions, etc.) that are encountered during construction. Contact a suitably qualified person(s) to remove the animals to safety. ❖ Do not throw or leave litter, food, or other foreign material around the site. Place this in demarcated rubbish and litter areas that are animal proof.	❖ Disturbance to fauna is minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		❖ Obtain the opinion and guidance of a suitably qualified person should any bats be noted in any of the mining areas. ❖ Demarcate the mining activities with beacons rather fences to allow free movement of roaming species. ❖ Restrict all mining operations to daylight hours.	
CULTURAL AND HERITAGE ENVIRONMENT Archaeological, Heritage and Palaeontological Aspects	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Archaeologist/Palaeontologist to comment should any features of importance be unearthed. Compliance to be monitored by the Environmental Control Officer.	❖ Confine all mining to the development footprint area. ❖ Implement the following change find procedure when discoveries are made on site: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. ❖ Implement the Fossil Chance Find Procedure, proposed in this document, should fossils be uncovered.	❖ Impact to cultural/heritage resources is avoided or at least minimised.
SOCIO-ECONOMIC ENVIRONEMNT / LAND USE Loss of Agricultural Land for Duration of Mining.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	❖ If needed, sign mined/rehabilitated areas back to agricultural use once the cover crop stabilised.	❖ Mining has the least possible impact on the operation of the property.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
	Compliance to be monitored by the Environmental Control Officer.		
EXISTING INFRASTRUCTURE Access Road Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Divert storm water around the access road to prevent erosion. ❖ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. ❖ Repair rutting and erosion of the access road caused as a direct result of the mining activities. ❖ Prevent the overloading of the truck and file proof of load weights for auditing purposes.	❖ The access road remains accessible to the landowner during the operational phase, and upon closure, the road is returned in a better, or at least the same state as received by the right holder.
GENERAL Waste Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	❖ Ensure regular vehicle maintenance, repairs and services only take place at the workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal. ❖ Provide all employees with ablution facilities. Ensure that the toilet is placed outside the 1:100-year floodline of the river. ❖ Ensure that ablution facilities drain into a septic tank with closed system. Do not install french drains on site. ❖ Ensure that the use of any temporary, chemical toilet facilities does not cause pollution to water sources or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. ❖ If a diesel bowser is used on site, always equip it with a drip tray. Ensure that drip trays are used during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. ❖ Clean drip trays after use. Do not use dirty drip trays.	❖ Wastes are appropriately handled and safely disposed of at recognised waste facilities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		❖ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. ❖ Should spillage occur, such as oil or diesel leaking from a burst pipe, collect the contaminated soil, within the first hour of occurrence, in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. ❖ Compile a waste management plan that focus on the waste hierarchy of the NEM:WA and implement it on site. ❖ Contain all general waste in marked, sealable, refuse bins placed at a designated area, to be removed when filled to a recognised general waste landfill site. ❖ Prevent the burning or burying of waste on site. ❖ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS and other relevant authorities.	
GENERAL Management of Health and Safety Risks	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Health and safety representative to manage H&S aspects at the mine. Compliance to be monitored by the Environmental Control Officer.	❖ Ensure adequate ablution facilities and water for human consumption is daily available on site. ❖ Ensure that workers have access to the correct PPE as required by law. ❖ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	❖ Employees work in a healthy and safe environment.

m) Final proposed alternatives.

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives, which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

During the EIA phase the no-go alternative, site alternative, and various layout alternatives were assessed upon receipt of the site-specific information, comments received from the public, and the results of the specialist studies. Below is a summary of the final proposed alternatives:

- **Site Alternative:**

Site Alternative 1 entails the mining of ±239 ha from Portion 0 and Portion 1 (Remaining Extent) of the farm De Klerks Kraal No 231, within the boundaries of the GPS coordinates listed in Table 4.

- **Layout Alternative:**

The FLA entails the following:

- The portioning of the proposed MR footprint into smaller (minor) areas of 2.5 ha each, of which a maximum of two minor areas will be mined at any given time;
- The excavation areas will be supported by a 1.5 ha processing area;
- The excavation (minor) areas, and processing area will be established outside the 38 m buffer proposed by the WRA;
- No mining will take place in any of the lateral streams or backwater wetlands identified by the specialist;
- Sand will be mined from the river channel using one sand pump (at any given time), with a single access made to allow for the installation and operation of the pump. The entrance into the river channel will be carefully selected to minimise disturbance of the marginal zone and avoid the steep banks of the river.
- Stormwater Management will be implemented as proposed in the SWMP attached as Appendix I.
- Progressive rehabilitation will be implemented throughout the operational phase of the project, following which the rehabilitated areas will be vegetated with indigenous plant species.

n) Aspects for inclusion as conditions of Authorization.

Any aspects which have not formed part of the EMPR that must be made conditions of the Environmental Authorization

The management objectives listed in this report under *Part A(1)(L) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* above should be considered for inclusion in the environmental authorisation.

Additional to those conditions the following must be considered as conditions of the Environmental Authorisation:

- The Applicant must obtain a Water Use Authorization in terms of Section 39 of the National Water Act,1998 (Act No. 36 of 1998) for water uses as defined in Section 21 of the Act.

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The assumptions made in this document which relate to the assessment and mitigation measures proposed, stem from site-specific information gathered from the Applicant, as well as site inspections, and background information. No uncertainty regarding the proposed project or the receiving environment could be identified at this stage.

p) Reasoned opinion as to whether the proposed activity should or should not be authorized

i) Reasons why the activity should be authorized or not.

The specialists agree that with extensive mitigation, management and monitoring the risk of the proposed activity on the receiving environment will be of moderate significance. As mentioned earlier, Moderate Sensitivity is normally applicable to areas that are still natural and therefore does still have some ecological importance, but which do not contain elements of high conservation value and are not essential to the continued functioning of surrounding areas. Areas of Moderate Sensitivity usually require some mitigation but can be developed without resulting in high impacts. In light thereof, it is proposed that should the Applicant commit to the project proposal as presented in this report, the mitigation measures, and monitoring programmes, no fatal flaws could at this point and time be identified that were deemed as severe as to prevent the activity continuing.

ii) Conditions that must be included in the authorization

(1) Specific conditions to be included into the compilation and approval of EMPR

The management objectives listed in this report under *Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* must be included into the compilation and approval of the EMPR.

(2) Rehabilitation requirements

The rehabilitation- and closure objectives proposed in *Part B(d)(i) Determination of Closure Objectives* and the Closure Plan attached as Appendix N, to this report, must be included in the authorisation.

Once the entire mining area was rehabilitated the MR Holder is required to submit a closure application to the Department of Mineral Resources and Energy in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

q) Period for which the Environmental Authorization is required.

The MR Holder requested that the Environmental Authorisation be valid for the duration of the mining right.

r) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Basic assessment report and the Environmental Management Programme report.

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme report.

s) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

i) Explain how the aforesaid amount was derived.

The amount required to annually manage and rehabilitate the affected environment was estimated to be R 196 280.00. Please see the explanation as to how this amount was derived at attached as Appendix O – Financial and Technical Competence Report.

ii) Confirm that this amount can be provided for from operating expenditure.

(Confirm that the amount is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

Vegablox (Pty) Ltd is responsible for the financial and technical aspects of the mining project. The operating expenditure is provided for as such in the Financial and Technical Competence Report attached as Appendix O to this report.

t) Deviations from the approved scoping report and plan of study.

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

No deviation from the methodology used in determining the significance of potential environmental impacts and risks were deemed necessary. The methodology described in the Scoping Report was also used in the Environmental Impact Assessment Report.

ii) Motivation for the deviation.

Not applicable.

u) Other Information required by the competent Authority

i) Compliance with the provisions of sections 24 (4) (a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA report must include the:

(1) Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or where applicable, potential

beneficiaries of any land restitution claim, attach the investigation report as Appendix 219.1 and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein).

The following potential impacts were identified that may affect socio-economic conditions of directly affected persons:

- **Visual intrusion associated with the mining:**

  The removal of the vegetation cover to access the sand will impact on the visual character of the study area. As shown previously, if the major area is apportioned into minor areas of which a maximum of only two are mined at any given time the visual impact of the proposed project is deemed to be of low-medium significance. Progressive rehabilitation will manage the visual impact, and upon final closure no residual impact is expected.

- **Impact on the air quality and noise ambiance of the study area:**

  The presence of the sand mining activity potentially increases the possibility of dust and noise related impacts on the receiving environment. By nature, these impacts require constant monitoring to be implemented throughout the operational-, and decommissioning phases of the project. However, should these impacts be adequately mitigated the impact is deemed to be of low significance.

- **Potential impact on downstream water users:**

  Mining within the riverbed of the Sand River trigger the National Water Act, 1998 in terms of Section 39, and the Applicant must obtain approval from the Department of Water and Sanitation prior to commencement with the activity. The hydrologists (contracted for this project) are of the opinion that the proposed project will have a moderate risk on the receiving environment, and that the most significant impacts could be adequately mitigated. Considering this, should the Applicant implement the proposed mitigation measures and adhere to the conditions of the water use licence (when received) the project should not result in any impacts that could affect the downstream water users.

- **Employment opportunities and socio-economic impact:**

  The proposed labour component of the activity will be sixteen employees. The operation will contribute to the local economy in the area, both directly and through the multiplier effect that its continued presence will create. Equipment and supplies will be purchased locally, and wages are spent at local businesses, generating both jobs and income in the area. Although the employees are not resident on the site, they will be from the surrounding community.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(*vi*) and (*vii*) of that Act, attach the investigation report as **Appendix 219.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein).

The specialists did not identify the presence of national estate as referred to in Section 3(2) of the NHRA, 1999 within the earmarked footprint of the study area.

v) Other matter required in terms of section 24(4)(a) and (b) of the Act.

(The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives as contemplated in sub-regulation 22(2)(h), exist the EAP must attach such motivation as **Appendix 4)**

The alternatives associated with the proposed activity, investigated during the impact assessment process, were done at the hand of information obtained during the site investigation, public participation process, specialist studies as well as desktop studies conducted of the study area. Refer to Part A(1)(m) *Final Proposed Alternatives*.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme.

a) Details of the EAP,

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

The details and expertise of Ms C Fouché of Greenmined Environmental (Pty) Ltd that acts as EAP on this project has been included in *Part A(1)(a) Details of Greenmined Environmental* as well as Appendix Q as required.

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required)

The aspects of the activity that are covered by the draft environmental management programme has been described and included in *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity*.

c) Composite Map

(Provide a map (**Attached as an Appendix**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers)

As mentioned under *Part A(1)(k)(ii) Finale Site Map* the map was compiled and is attached as Appendix C.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives.

(Ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The primary objective, at the end of the mine's life, is to obtain a closure certificate at minimum cost and in as short a time as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA]. To realise this, the following main objectives must be achieved:

- Remove all infrastructure and waste from the mine as per the requirements of this EMPR and of the Provincial Department of Minerals and Resources and Energy.
- Shape and contour disturbed areas in compliance with the EMPR.
- Ensure that permanent changes in topography (due to mining) are sustainable and do not cause erosion or the damming of surface water.
- Make all excavations safe.
- Use the topsoil effectively to promote the re-establishment of vegetation.
- Ensure that all rehabilitated areas are stable and self-sustaining in terms of vegetation cover.
- Eradicate all weeds/invader plant species by intensive management of the mining area.

The site-specific closure objectives are discussed in detail in the attached Closure Plan (Appendix N), however, a summary of the closure objectives for the proposed mine was included below.

As mentioned earlier, the rehabilitation will include activities to be divided into medium- and long-term categories. In the medium term, rehabilitation will entail the continuous reinstatement of mined minor areas, and the management of weeds and invasive plant species. In the long term, rehabilitation will involve the reinstatement of the processing area by removing the stockpiled material and site infrastructure/equipment and landscaping the disturbed footprints. The MR holder will further be responsible for the seeding of all rehabilitated areas.

The decommissioning activities will therefore consist of the following:

- Sloping and landscaping the excavations;
- Removing all stockpiled material;
- Removing all mining machinery and equipment from site;
- Landscaping all disturbed areas and replacing the topsoil;
- Vegetating the reinstated area; and
- Controlling/monitoring the invasive plant species.

The future land use of the rehabilitated mining footprint will be agriculture. Upon replacement of the topsoil, the area will be available for grazing purposes, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed land use.

The MR Holder will comply with the minimum closure objectives as prescribed by DMRE and detailed below:

Rehabilitation of the excavated area:

- The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material (if any) removed from the excavation must be dumped into the excavation.
- No waste may be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Rehabilitation of processing area:

- Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.
- Stockpiles must be removed during the decommissioning phase, the area ripped, and the topsoil returned to its original depth to provide a growth medium.
- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
  - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.

- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

- Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMRE Regional Manager.
- On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.
- The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMRE Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- All mining equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- Waste material of any description, including receptacles, scrap, rubble, and tyres, must be removed entirely from the mining area, and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- Final rehabilitation must be completed within a period specified by the Regional Manager (DMRE).

Once the mining area was rehabilitated the MR Holder is required to submit a closure application to the Department of Mineral Resources and Energy in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

Due to the nature of the mining operation, it is believed that the risk of environmental damage or pollution is of medium significance. If site management implement the mitigation measures as prescribed in this document, it is believed that the impact on the receiving environment can be adequately controlled.

iii) Potential risk of Acid Mine Drainage.

(Indicate whether or not the mining can result in acid mine drainage).

Not applicable.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

Not applicable.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.

Not applicable.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.

Not applicable.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.

As mentioned in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.3 Water Management* the Applicant intends to use water from the Sand River to wash the sand products and control dust within the mining footprint. As mentioned earlier, the water needed for the washing plant will be recycled to minimise the need for supplement water. Should the DWS not approve the proposed abstraction of water from the river, the Applicant will use water from an existing borehole on the farm, currently used by the existing sand mine on the property. The WULA of the Applicant makes provision for the use of ±91 200 m^3/annum.

viii) Has a water use license been applied for?

A water use application in terms of Section 21 of the National Water Act, 1998 (Act No 36 of 1998) (NWA) was submitted to the DWS on 01 March 2022. Presently the application is still in process.

ix) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

Table 33: Impact to be mitigated in their respective phases

ACTIVITIES (as listed in 2.11.1)	PHASE of operation in which activity will take place. State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m^2)	MITIGATION MEASURES (describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)	COMPLIANCE WITH STANDARDS (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either – Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
❖ Demarcation of the minor areas with visible beacons.	Site Establishment phase	238.5426 ha	Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area.	Mining is only allowed within the boundaries of the approved area. ❖ MPRDA, 2002 ❖ NEMA, 1998	Beacons need to be in place throughout the life of the mine.
❖ Site establishment	Site Establishment, and Operational Phase	2.5 ha / minor area (max. 5 ha at a time) &	**<u>Loss of Agricultural Land for Duration of Mining:</u>** ❖ The temporary loss of agricultural land for the duration of the mining period is acceptable to the landowner. If needed, mined/rehabilitated areas will revert back to agricultural use once the cover crop stabilised.	Use of agricultural land must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N)	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
		1.5 ha (processing area)			
❖ Site establishment	Site Establishment- & Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**Visual Mitigation:** ❖ Operational areas may not exceed the proposed 6.5 ha (two 2.5 ha minor areas, and 1.5 ha for processing) at any given time. ❖ The site must have a neat appearance and be always kept in good condition. ❖ Mining equipment must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use. ❖ Concurrent rehabilitation must be done as mining progress to limit the visual impact on the aesthetic value of the area. ❖ The MR Holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area. ❖ Upon closure the site must be rehabilitated and levelled to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	Management of the mining activities must be in accordance with the: ❖ MPRDA, 2002 ❖ NEMA, 1998	Throughout the site establishment- and operational phases.
❖ Site establishment ❖ Cumulative impacts	Site Establishment- & Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**Management of Ecological Support Area and Broad-Scale Ecological Processes:** ❖ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.	Natural vegetated areas must be managed in accordance with the: ❖ NEM:BA 2004	Throughout the site establishment- and operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			❖ The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly. ❖ An invasive plant species management plan must be implement on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas. ❖ The protection of the riverine ecology must be ensured as far as possible. If not possible, endangered and/or protected species (if present) must be transplanted in compliance with the legislation and permits for the translocation of species.		
❖ Site establishment ❖ Sloping and landscaping (medium- & long term).	Site Establishment- and, Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**Topsoil Management:** ❖ The upper 300 mm of soil must be stripped and stockpiled before mining. ❖ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes. ❖ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time. ❖ The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas. ❖ Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment	Topsoil stripping must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N) ❖ MPRDA, 2002 ❖ NEM:BA, 2004 ❖ SWMP	Throughout the site establishment-, operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion. ❖ Topsoil heaps may not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ❖ The temporary topsoil stockpiles must be kept free of invasive plant species. ❖ Storm- and runoff water must be diverted around the stockpile area to prevent erosion. ❖ The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site. ❖ The Applicant must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal. ❖ A cover crop must be planted, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production, and any soil deficiencies must be corrected, based on a chemical analysis of the re-spread soil (if deemed necessary). It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			considered complete until the first cover crop is well established. ❖ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.		
❖ Site establishment ❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term). ❖ Cumulative Impacts	Site Establishment- and, Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**<u>Erosion Cotnrol and Stormwater Management:</u>** ❖ The Stormwater Management Plan, appended to this document, must be implemented on site. ❖ Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion. ❖ Drainage must be controlled to ensure that runoff from the mining area does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points. ❖ Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas. ❖ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose: ▪ Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean	Soil and the associated Sand River must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N) ❖ MPRDA, 2002 ❖ NEM:BA, 2004 ❖ NWA, 1998 ❖ SWMP	Throughout the site establishment-, operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			water from running or spilling into dirty water systems. ▪ Dirty water must be collected and contained in a system separate from the clean water system. ▪ Dirty water must be prevented from spilling or seeping into clean water systems. ▪ A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns). ▪ The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.		
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	Site Establishment & Operational-, and Decommissioning Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**Management of Invasive Plant Species:** ❖ An invasive plant species management plan (Appendix L) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities. ❖ All stockpiles (topsoil & overburden) must be kept free of invasive plant species. ❖ Management must take responsibility to control declared invader or exotic species on the	Invader plants must be managed in accordance with the: ❖ CARA, 1983 ❖ NEM:BA 2004 ❖ Invasive Plant Species Management Plan (Appendix N)	Throughout the site establishment-, operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			rehabilitated areas. The following control methods can be used: ▪ The plants can be uprooted, felled or cut off and can be destroyed completely. ▪ The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.		
❖ Site establishment.	Site Establishment- & Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**<u>Protection of Terrestrial Fauna:</u>** ❖ The site manager must ensure no fauna is caught, killed, harmed, sold or played with. ❖ Any fauna directly threatened by the operational activities must be removed to a safe location by a competent person. ❖ All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Workers must be instructed to report any animals that may be trapped in the working area. ❖ No snares may be set or nests raided for eggs or young. ❖ All vehicles must adhere to a low speed limit (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises.	Fauna must be managed in accordance with the: ❖ NEM:BA 2004	Throughout the site establishment- and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			❖ No activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ❖ Any dangerous fauna (snakes, scorpions, etc.) that are encountered during construction must not be handled or antagonised by the construction staff. A suitably qualified person(s) must be contacted to remove the animals to safety. ❖ No litter, food or other foreign material must be thrown or left around the site and must be placed in demarcated rubbish and litter areas that are animal proof. ❖ Should any bats be noted in any of the mining areas, the opinion and guidance of a suitably qualified person must be obtained. ❖ The mining activities must be demarcated with beacons rather than being fenced off allow free movement of roaming species. ❖ Restrict all mining operations to daylight hours.		
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site.	Site Establishment- and, Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**<u>Fugitive Dust Emission Mitigation:</u>** ❖ The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). ❖ The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression.	Dust generation must be managed in accordance with the: ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			❖ Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust. ❖ Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining. ❖ Loads must be flattened to prevent spillage and covered during transportation on public roads. ❖ Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts. ❖ All dust generating activities shall comply with the National Dust Control Regulations, GNR 827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012). ❖ Best practice measures shall be implemented during the stripping of topsoil, excavating, processing, and transporting of the material from site to minimize potential dust impacts.		
❖ Site establishment. ❖ Winning of sand – from the floodplain/riparian area. ❖ Processing, stockpiling and transporting material from site.	Site Establishment- & Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**<u>Noise Handling:</u>** ❖ The Applicant must ensure that the employee and visitors to the site conduct themselves in an acceptable manner while on site. ❖ No loud music may be permitted at the mining area. ❖ All mining vehicles must be equipped with silencers and maintained in a road worthy	Noise generation must be managed in accordance with the: ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
❖ Sloping and landscaping (medium- & long term).			condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996). ❖ Best practice measures shall be implemented in order to minimize potential noise impacts. ❖ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.		
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**<u>Mitigating the potential impact on the Sand River, Riparian Areas, and Downstream Users:</u>** ❖ The flow of the river may at no point be changed, dammed or diverted without prior authorisation from the Department of Water and Sanitation (DWS). ❖ No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. ❖ The Applicant must at all times adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities. ❖ No equipment of any kind may be stored within the riverbed. ❖ A 38 m buffer must be established and maintained as no-go area around the river	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP	Throughout the operational phase.
❖ Winning of sand – from the floodplain/riparian area	Site Establishment- & Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)		The riparian vegetation must be protected in accordance with the: ❖ NWA, 1998; ❖ NEM:BA, 2004	Throughout the site establishment-, and operational phase.
❖ Winning of sand – from the floodplain/riparian area	Operational Phase	2.5 ha / minor area		The Sand River must be shielded in accordance with the: ❖ NWA, 1998	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
		(max. 5 ha at a time) & 1.5 ha (processing area)	channel, wetland conditions (marginal- and lower zones), lateral streams, and backwater wetlands. The floodplain/riparian area mining, and processing area must be established outside the 38 m buffer area. ❖ Excavations must be limited to the mining of a maximum of two minor areas, supported by one processing area at any given time. ❖ Once an area is mined, it must be rehabilitated prior to the opening of a consecutive minor area. ❖ Only one sand pump, including infrastructure and access road, may be utilised at any time and the site must be rehabilitated immediately after moving the pump to another location along the site. ❖ The entrance point into the river must be carefully selected to minimise disturbance of the marginal zone and avoid the steep banks of the river. It must also be clearly demarcated to prevent sprawling. ❖ Any disturbance of the riverbank must be adequately rehabilitated which must include re-instatement of the natural topography, replacement of topsoil, prevention of erosion and monitoring and eradication of problematic weeds and invasives ❖ Where disturbance of the banks or floodplain takes place the removal of vegetation must be kept to a minimum. ❖ Prior to the clearing of any vegetation, an appropriately qualified specialist must conduct a walk-through inspection to identify any sensitive and/or protected plants that may have to be	❖ WULA conditions ❖ SWMP	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			relocated before the area is mined. Special focus must be placed on species such as *Ammocharis coranica, Crinum bulbispermum, Kniphofia ensifolia*. If needed plant relocation/destruction permits must be obtained from the relevant authorities, and filed on site for auditing purposes. ❖ Adequate storm water management measures must be implemented and must include diverting storm- and floodwater around the stockpile and excavation areas and preventing sediment and silt from entering the river. ❖ Necessary precautions must be taken to ensure that floodwaters are diverted around the processing/stockpile- and excavation areas by means of berms. ❖ Rehabilitation must endeavour to re-instate a geomorphology which will form part of a functional system and must refrain from leaving open excavations or pits. ❖ A comprehensive monitoring programme must be followed to quantify impacts and recommend mitigation. Such monitoring must include quarterly water quality sampling, sediment release (turbidity), Index of Habitat Integrity and SASS5 or a combination thereof. ❖ Continued bi-annual monitoring of the habitat, macro-invertebrate and fish communities at the reference sites, which vary seasonally.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscapting (medium- & long terrm).	Operational-, and Decommissioning Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**Waste Management:** ❖ Vehicle maintenance, repairs and services may only take place at the workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. ❖ Ablution facilities must be provided to all employees. The toilet must be placed outside the 1:100 year floodline of the river. ❖ Ablution facilities must drain into a septic tank with closed system. No french drains may be installed on site. ❖ The ablution facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage. Any pollution problems arising from the above are to be addressed immediately by the Applicant. ❖ If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. ❖ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.	Mining related waste must be managed in accordance with the: ❖ NWA, 1998 ❖ NEM:WA, 2008 ❖ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ❖ NEMA, 1998 (Section 30)	Throughout the site establishment-, operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			❖ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. ❖ Should spillage occur, such or as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed. ❖ A waste management plan must be compiled by site management and implemented on site. The plan must focus on the waste hierarchy of the NEM:WA. ❖ General waste must be contained in marked, sealable, refuse bins placed at a designated area, to be removed when filled to capacity to a recognised general waste landfill site. ❖ No waste may be buried burned on the site. ❖ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.		
❖ Winning of sand – from the floodplain/riparian area.	Site Establishment & Operational Phase	2.5 ha / minor area (max. 5 ha at a time) &	**Archaeological, Heritage and Palaeontological Aspects:** ❖ All mining must be confined to the development footprint area.	Cultural/heritage aspects must be managed in accordance with the: ❖ NHRA, 1999	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
		1.5 ha (processing area)	❖ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ❖ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ❖ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA. ❖ Work may only continue once the go-ahead was issued by SAHRA. ❖ The Fossil Chance Find Procedure, proposed in this document, must be implemented should fossils be uncovered.		
❖ Processing, stockpiling and transporting material from site.	Operational Phase	±1 km	**Access Road Mitigation and Traffic Accomodation:** ❖ Storm water must be diverted around the access road to prevent erosion. ❖ Vehicular movement must be restricted to the existing access roads and crisscrossing of	All mining related traffic must adhere to the requirements of the: ❖ NRTA, 1996	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			tracks through undisturbed areas must be prohibited. ❖ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the Applicant. ❖ Overloading of the trucks must be prevented, and proof of load weights must be filed for auditing purposes.		
❖ Site Establishment ❖ Winning of Sand – from the floodplain/riparian area ❖ Processing, Stockpiling and Transporting Material from Site ❖ Sloping and Landscaping (Medium- & Long Term)	Operational Phase	2.5 ha / minor area (max. 5 ha at a time) & 1.5 ha (processing area)	**Management of Health and Safety Risks:** ❖ Adequate ablution facilities and water for human consumption must daily be available on site. ❖ Worker(s) must have access to the correct personal protection equipment (PPE) as required by law. ❖ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	All mining activities must be in accordance with the: ❖ MHSA, 1996 ❖ OHSA, 1993	Throughout the operational-, and decommissioning phase.

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ()):

Table 34: Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)		In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
❖ Demarcation of site with visible beacons.	❖ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	<u>Control:</u> Implementation of proper housekeeping and site management.	Mining is only allowed within the boundaries of the approved area. ❖ MPRDA, 2002 ❖ NEMA, 1998
❖ Site establishment	❖ Loss of agricultural land for duration of mining.	The impact may affect the agricultural operations of the property.	Site Establishment- & Operational Phase	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	Use of agricultural land must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
❖ Site establishment	❖ Visual intrusion because of site establishment.	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	Control: Proper housekeeping and implementation of progressive rehabilitation.	Management of the mining activities must be in accordance with the: ❖ MPRDA, 2002 ❖ NEMA, 1998
❖ Site establishment	❖ Potential negative impact on the ESA and Broad-Scale Ecological Processes.	This may impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	Control: Implementing the proposed mitigation measures and mining only two minor areas at a time.	Natural vegetated areas must be managed in accordance with the: ❖ NEM:BA 2004
❖ Site establishment ❖ Sloping and landscaping (medium- & long term).	❖ Loss of topsoil and fertility during site establishment. ❖ Erosion of returned topsoil after rehabilitation.	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment- & Operational Phase	Control & Remedy: Proper housekeeping and storm water management.	Topsoil stripping must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N) ❖ MPRDA, 2002 ❖ NEM:BA, 2004 ❖ SWMP
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	❖ Infestation of the topsoil heaps and mining area with invader plant species. ❖ Infestation of the denuded areas with invader plant species. ❖ Infestation of the reinstated area with invader plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational-, and Decommissioning Phase	Control: Implementing soil- and invader plant control/management.	Invader plants must be managed in accordance with the: ❖ CARA, 1983 ❖ NEM:BA 2004 ❖ Invasive Plant Species Management Plan (Appendix L)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
❖ Site establishment.	❖ Potential impact on terrestrial fauna within the footprint area.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	Control & Stop: Implementing good management practices and the proposed mitigation measures.	Fauna must be managed in accordance with the: ❖ NEM:BA 2004
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site.	❖ Dust nuisance because of the site establishment activities. ❖ Dust nuisance because of the mining activities.	Increased dust will impact on the air quality of the receiving environment.	Site Establishment- & Operational Phase	Control: Dust suppression methods and proper housekeeping.	Dust generation must be managed in accordance with the: ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)
❖ Site establishment. ❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	❖ Noise nuisance because of the site establishment activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the decommissioning activities.	Should the noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment- and, Operational Phase	Control: Noise suppression methods and proper housekeeping.	Noise generation must be managed in accordance with the: ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Modification of geomorphology ❖ Modification of geomorphology	A change in geomorphology of the river could affect the flow regime and associated water users (fauna, flora, and human)	Operational Phase	Control & Remedy: Implementing the proposed mitigation measures as well as progressive rehablitation.	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
❖ Winning of sand – from the floodplain/riparian area	❖ Loss of some of the riparian vegetation	Denuded areas can lead to erosion and sedimentation of the river	Operational Phase	Control: Implementing the proposed mitigation measures and mining of only two minor areas at a time.	The riparian vegetation must be protected in accordance with the: ❖ NWA, 1998; ❖ NEM:BA, 2004
❖ Winning of sand – from the floodplain/riparian area ❖ Cumulative Impacts	❖ Contributing towards increased sedimentation of the aquatic and riparian habitat ❖ Increased sediment leads to the sedimentation of unique bedrock communities ❖ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community	Increased sedimentation of the river could have a negative impact on unique bedrock communities, as well as a decrease in instream and marginal macrophytes and aquatic communities.	Operational Phase	Control & Stop: Through the proosed mitigation measures and continuous aquatic health monitoring.	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Causing local modification and de-stabilisation of the bank ❖ Causing local modification and de-stabilisation of the bank	Altering the banks of the river could affect the entire flow regime.	Operational Phase	Control & Stop: Through the proosed mitigation measures and proper stormwater control.	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscapting (medium- & long terrm).	❖ Potential soil contamination from hydrocarbon- and other spills. ❖ Potential impact associated with littering and hydrocarbon spills. ❖ Potential impact associated with litter/hydrocarbon spills left at the mining area.	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the MR Holder. .	Operational-, and Decommissioning Phase	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	Mining related waste must be managed in accordance with the: ❖ NWA, 1998 ❖ NEM:WA, 2008 ❖ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ❖ NEMA, 1998 (Section 30)
❖ Winning of sand – from the floodplain/riparian area	❖ Potential impact on areas/infrastructure of heritage or cultural concern.	The impact could affect the cultural sense and/or artefacts of the area.	Site Establishment- and, Operational Phase	<u>Control & Stop:</u> Implementation of a chance-find procedure.	Cultural/heritage aspects must be managed in accordance with the: ❖ NHRA, 1999
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed ❖ Processing, stockpiling and transporting material from site.	❖ Loss of mining equipment due to unexpected flooding. ❖ Loss of mining equipment due to unexpected flooding ❖ Flooding of the area during large floods	This impact could result in financial losses to the sand mine.	Operational Phase	<u>Control</u>: Implementing the proposed mitigation measures.	Mining must take place in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the riverbed ❖ Sloping and landscapting (medium- & long terrm) ❖ Cumulative Impacts	❖ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of	This impact could affect the hydrology and downstream water users.	Operational Phase	<u>Control & Modify:</u> Implementation of the proposed mitigation measures and continuous aquatic health monitoring.	Mining must take place in accordance with the: ❖ NWA, 1998 ❖ WULA conditions

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	aquatic habitat in the river ❖ Residual impact on the flow regime of the Sand River ❖ Combined impact on the flow regime of the river				❖ SWMP
❖ Winning of sand – from the riverbed	❖ Potential impact on local and downstream water quality and –users.	This impact could affect the hydrology and downstream water users.	Operational Phase	Control: Implementing the proposed mitigation measures and keeping mining operations to the approved boundaries.	Mining must take place in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Processing, stockpiling and transporting material from site.	❖ Deterioration of the access road to the mining area. ❖ Overloading of trucks having an impact on the public roads.	Impacting the condition of public roads may incur public complaints and additional costs to the MR Holder.	Operational Phase	Control & Remedy: Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	All mining related traffic must adhere to the requirements of the: ❖ NRTA, 1996

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

Table 35: Impact Management Actions

ACTIVITY whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.	TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either: Upon cessation of the individual activity Or . Upon the cessation of mining bulk sampling or alluvial diamond prospecting as the case may be.	COMPLIANCE WITH STANDARDS (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
❖ Demarcation of site with visible beacons.	❖ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	Control: Implementation of proper housekeeping and site management.	Beacons need to be in place throughout the life of the mine.	Mining is only allowed within the boundaries of the approved area. ❖ MPRDA, 2002 ❖ NEMA, 1998
❖ Site establishment	❖ Loss of agricultural land for duration of mining.	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	Site Establishment- & Operational Phase	Use of agricultural land must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
❖ Site establishment	❖ Visual intrusion because of site establishment.	Control: Proper housekeeping and implementation of progressive rehabilitation.	Site Establishment- & Operational Phase	Management of the mining activities must be in accordance with the: ❖ MPRDA, 2002 ❖ NEMA, 1998
❖ Site establishment	❖ Potential negative impact on the ESA and Broad-Scale Ecological Processes.	Control: Implementing the proposed mitigation measures and mining only two minor areas at a time.	Site Establishment- & Operational Phase	Natural vegetated areas must be managed in accordance with the: ❖ NEM:BA 2004
❖ Site establishment ❖ Sloping and landscaping (medium- & long term).	❖ Loss of topsoil and fertility during site establishment. ❖ Erosion of returned topsoil after rehabilitation.	Control & Remedy: Proper housekeeping and storm water management.	Site Establishment- & Operational Phase	Topsoil stripping must be managed in accordance with the: ❖ CARA, 1983 ❖ Closure Plan (Appendix N) ❖ MPRDA, 2002 ❖ NEM:BA, 2004 ❖ SWMP
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	❖ Infestation of the topsoil heaps and mining area with invader plant species. ❖ Infestation of the denuded areas with invader plant species. ❖ Infestation of the reinstated area with invader plant species.	Control: Implementing soil- and invader plant control/management.	Site Establishment, Operational-, and Decommissioning Phase	Invader plants must be managed in accordance with the: ❖ CARA, 1983 ❖ NEM:BA 2004 ❖ Invasive Plant Species Management Plan (Appendix L)
❖ Site establishment.	❖ Potential impact on terrestrial fauna within the footprint area.	Control & Stop: Implementing good management practices and the proposed mitigation measures.	Site Establishment-and, Operational Phase	Fauna must be managed in accordance with the: ❖ NEM:BA 2004

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site.	❖ Dust nuisance because of the site establishment activities. ❖ Dust nuisance because of the mining activities.	Control: Dust suppression methods and proper housekeeping.	Site Establishment- & Operational Phase	Dust generation must be managed in accordance with the: ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)
❖ Site establishment. ❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	❖ Noise nuisance because of the site establishment activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the decommissioning activities.	Control: Noise suppression methods and proper housekeeping.	Site Establishment-and, Operational Phase	Noise generation must be managed in accordance with the: ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Modification of geomorphology ❖ Modification of geomorphology	Control & Remedy: Implementing the proposed mitigation measures as well as progressive rehablitation.	Operational Phase	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the floodplain/riparian area	❖ Loss of some of the riparian vegetation	Control: Implementing the proposed mitigation measures and mining of only two minor areas at a time.	Operational Phase	The riparian vegetation must be protected in accordance with the: ❖ NWA, 1998; ❖ NEM:BA, 2004

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
❖ Winning of sand – from the floodplain/riparian area ❖ Cumulative Impacts	❖ Contributing towards increased sedimentation of the aquatic and riparian habitat. ❖ Increased sediment leads to the sedimentation of unique bedrock communities. ❖ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community.	Control & Stop: Through the proosed mitigation measures and continuous aquatic health monitoring.	Operational Phase	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed	❖ Causing local modification and de-stabilisation of the bank ❖ Causing local modification and de-stabilisation of the bank	Control & Stop: Through the proosed mitigation measures and proper stormwater control.	Operational Phase	The Sand River must be shielded in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscapting (medium- & long terrm).	❖ Potential soil contamination from hydrocarbon- and other spills. ❖ Potential impact associated with littering and hydrocarbon spills. ❖ Potential impact associated with litter/hydrocarbon spills left at the mining area.	Control & Remedy: Proper housekeeping and implementation of an emergency response plan and waste management plan.	Site Establishment- & Operational Phase	Mining related waste must be managed in accordance with the: ❖ NWA, 1998 ❖ NEM:WA, 2008 ❖ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ❖ NEMA, 1998 (Section 30)
❖ Winning of sand – from the floodplain/riparian area	❖ Potential impact on areas/infrastructure of heritage or cultural concern.	Control & Stop: Implementation of a chance-find procedure.	Site Establishment-and, Operational Phase	Cultural/heritage aspects must be managed in accordance with the: ❖ NHRA, 1999

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed ❖ Processing, stockpiling and transporting material from site.	❖ Loss of mining equipment due to unexpected flooding. ❖ Loss of mining equipment due to unexpected flooding. ❖ Flooding of the area during large floods.	Control: Implementing the proposed mitigation measures.	Site Establishment-and, Operational Phase	Mining must take place in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the riverbed ❖ Sloping and landscapting (medium- & long terrm) ❖ Cumulative Impacts	❖ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river ❖ Residual impact on the flow regime of the Sand River ❖ Combined impact on the flow regime of the river	Control & Modify: Implementation of the proposed mitigation measures and continuous aquatic health monitoring.	Operational Phase	Mining must take place in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Winning of sand – from the riverbed	❖ Potential impact on local and downstream water quality and –users.	Control: Implementing the proposed mitigation measures and keeping mining operations to the approved boundaries.	Operational Phase	Mining must take place in accordance with the: ❖ NWA, 1998 ❖ WULA conditions ❖ SWMP
❖ Processing, stockpiling and transporting material from site.	❖ Deterioration of the access road to the mining area. ❖ Overloading of trucks having an impact on the public roads.	Control & Remedy: Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	Operational Phase	All mining related traffic must adhere to the requirements of the: ❖ NRTA, 1996

i) Financial Provision

(1) Determination of the amount of Financial Provision.

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.

The decommissioning phase will entail the reinstatement of the processing area by removing the stockpiled material and site infrastructure/equipment and landscaping the disturbed footprints. Due to the impracticality of importing large volumes of fill to restore the excavated areas to its original topography, the rehabilitation option is to create a series of irregular benches thereby reducing the overall face angle. The benches will be top-dressed with topsoil and vegetated with an appropriate grass mix (indigenous species) if vegetation does not naturally establish in the area within six months of the replacement of the topsoil. The applicant will comply with the minimum closure objectives as prescribed by DMRE.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

This report, the final EIAR & EMPR, includes all the environmental objectives in relation to closure and was available for perusal by the landowner, I&AP's and stakeholders over a 30-days commenting period. The comments received on the draft EIAR were incorporated into the Final EIAR & EMPR.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The rehabilitation plan is attached as Appendix E.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The decommissioning phase will entail the final rehabilitation of the proposed mining footprint. Final landscaping, levelling and top dressing will be done on all areas to be rehabilitated. The rehabilitation of the mining area as indicated on the rehabilitation map attached as Appendix E will comply with the minimum closure objectives as prescribed by DMRE and detailed below, and therefore is deemed compatible:

Rehabilitation of the excavated area:

- The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material (if any) removed from the excavation must be dumped into the excavation.
- No waste may be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Rehabilitation of plant/processing area:

- Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.
- Stockpiles must be removed during the decommissioning phase, the area ripped, and the topsoil returned to its original depth to provide a growth medium.
- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
  - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
  - The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

- Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMRE Regional Manager.
- On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.
- The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMRE Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- All mining equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- Waste material of any description, including receptacles, scrap, rubble, and tyres, must be removed entirely from the mining area, and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- Final rehabilitation must be completed within a period specified by the Regional Manager (DMRE).

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The calculation of the quantum for financial provision was according to Section B of the working manual.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

Mine type	Sand
Saleable mineral by-product	None

Risk ranking

According to Tables B.12, B.13 and B.14

Primary risk ranking (either Table B.12 or B.13	C (Low risk)
Revised risk ranking (B.14)	N/A

Environmental sensitivity of the mine area

According to Table B.4

Environmental sensitivity of the mine area	Low

Level of information

According to Step 4.2:

Level of information available	Extensive

Identify closure components

According to Table B.5 and site-specific conditions

COMPONENT NO.	MAIN DESCRIPTION	APPLICABILITY OF CLOSURE COMPONENTS (CIRCLE YES OR NO)	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	NO
2(A)	Demolition of steel buildings and structures	-	NO
2(B)	Demolition of reinforced concrete buildings and structures	-	NO
3	Rehabilitation of access roads	-	NO
4(A)	Demolition and rehabilitation of electrified railway lines	-	NO
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	NO
5	Demolition of housing and facilities	-	NO
6	Opencast rehabilitation including final voids and ramps	YES	-
7	Sealing of shafts, adits and inclines	-	NO
8(A)	Rehabilitation of overburden and spoils	-	NO
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	NO
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	NO
9	Rehabilitation of subsided areas	-	NO
10	General surface rehabilitation, including grassing of all denuded areas	YES	-
11	River diversions	-	NO
12	Fencing	-	NO
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	NO
14	2 to 3 years of maintenance and aftercare	YES	-

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components. The master rate from the DMRE Master Rates table for financial provision of 2022 was used.

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
3	Rehabilitation of access roads	-	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	-	-
6	Opencast rehabilitation including final voids and ramps	284 292	0.04
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	-	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	-
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	-	-
10	General surface rehabilitation, including grassing of all denuded areas	150 138	1.00
11	River diversions	-	-
12	Fencing	-	-
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	-
14	2 to 3 years of maintenance and aftercare	19 980	1.00

Determine weighting factors

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.00 (Flat)
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.05 (Peri-Urban)

Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision.

Table 36: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	**Vengablox Sand Mine**			**Location:**	**Theunissen**		
Evaluators:	**C Fouché**			**Date:**	**08 March 2022**		
No	**Description**	**Unit**	**A Quantity**	**B Master rate**	**C Multiplication factor**	**D Weighting factor 1**	**E=A *B*C*D Amount (rands)**
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3	0	19	1.00	1.00	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	271	1.00	1.00	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	400	1.00	1.00	R 0.00
3	Rehabilitation of access roads	m^2	0	49	1.00	1.00	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1.00	1.00	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	257	1.00	1.00	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	542	1.00	1.00	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	5	284 292	0.04	1.00	R 56 858.40
7	Sealing of shaft, audits and inclines	m^3	0	146	1.00	1.00	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	189 528	1.00	1.00	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	236 054	1.00	1.00	R 0.00

8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	685 612	0.51	1.00	R 0.00
9	Rehabilitation of subsided areas	ha	0	158 701	1.00	1.00	R 0.00
10	General surface rehabilitation	ha	1.5	150 138	1.00	1.00	R 225 207.00
11	River diversions	ha	0	150 138	1.00	1.00	R 0.00
12	Fencing	m	0	171	1.00	1.00	R 0.00
13	Water Management	ha	0	57 087	0.17	1.00	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	6.5	19 980	1.00	1.00	R 129 870.00
15(A)	Specialists study	Sum	0				R 0.00
15(B)	Specialists study	Sum	0				R 0.00
						Sum of items 1 to 15 above	R 411 935.40
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 411 935.40		**Sub Total 1**	R 432 532.17

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 25 951.93
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R 43 253.22
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 501 737.32
		Vat (15%)	R 75 260.60
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 576 997.91**

According to the above calculations, the amount that will be necessary for the rehabilitation of damages caused by the operation, both at sudden closure during the normal operation of the project and at final, planned closure gives a sum of R 576 997.91.

(f) Confirm that the financial provision will be provided as determined.

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the right holder in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including

g) Monitoring of Impact Management Actions
h) Monitoring and reporting frequency
i) Responsible persons
j) Time period for implementing impact management actions
k) Mechanism for monitoring compliance

Table 37: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
❖ Demarcation of site with visible beacons.	❖ Maintenance of beacons	❖ Visible beacons need to be established at the corners of each minor area. ❖ The 38 m buffer around the sensitive areas must be demarcated. ❖ The entry point into the river must be	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Responsibility: ❖ Ensure beacons are in place throughout the life of the mine.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		demarcated to prevent sprawling.		
❖ Site establishment	Land Use: ❖ Loss of agricultural land for duration of mining.	❖ Mining schedule.	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Responsibility: ❖ If needed, sign mined/rehabilitated areas back to agricultural use once the cover crop stabilised.	Applicable throughout site establishment- and operational phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
❖ Site establishment	Visual Characteristics ❖ Visual intrusion as a result of site establishment.	❖ Parking areas for equipment. ❖ Good housekeeping practices.	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Responsibility: ❖ Do not exceed the proposed 6.5 ha (two 2.5 ha minor areas, and 1.5 ha for processing) operational areas at any given time. ❖ Ensure that the site have a neat appearance and is always kept in good condition. ❖ Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. ❖ Implement concurrent rehabilitation as mining progress to limit the visual impact on the aesthetic value of the area. ❖ Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	
❖ Site establishment	Mining, Biodiversity and Groundcover ❖ Potential negative impact on the ESA and Broad-Scale Ecological Processes.	❖ Visible beacons indicating the boundary of the mineable areas. ❖ Pre-commencement walkthrough with specialist. ❖ Removal permit should protected or red data species be relocated. ❖ Cover crop to seed reinstated areas.	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Responsibility: ❖ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ❖ Declare the area outside the mining boundaries a no-go area and educate all employees accordingly. ❖ Implement an invasive plant species management plan n site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas. ❖ Ensure the protection of the riverine ecology as far as possible. If not possible, transplant the endangered and/or protected species (if present) in compliance with the legislation and permits for the translocation of species.	Applicable throughout site establishment-, and operational phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
❖ Site establishment ❖ Sloping and landscaping (medium- & long term).	Geology and Soil: ❖ Loss of topsoil and fertility during site establishemnt.	❖ Earthmoving equipment to strip, stockpile and spread the topsoil. ❖ Stormwater control infrastructure.	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.	Applicable throughout site establishment-, and operational phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	❖ Erosion of returned topsoil after rehabilitation.	❖ Designated team to control weeds/invader plant species that may germinate on the topsoil heaps. ❖ Cover crop to vegetate topsoil heaps (when needed) and reinstated soil.	<u>Responsibility:</u> ❖ Strip and stockpile the upper 300 mm of the soil before mining. ❖ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. ❖ Ensure topsoil stripping, stockpiling, and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. ❖ Place the topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas. ❖ Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establish plants (weeds or a cover crop) on the stockpiles to prevent erosion. ❖ Ensure that topsoil heaps do not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ❖ Keep temporary topsoil stockpiles free of invasive plant species. ❖ Divert storm- and runoff water around the stockpile area to prevent erosion. ❖ Spread the topsoil evenly, to a depth of 300 m, over the rehabilitated area upon closure of the site. ❖ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. ❖ Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum production. Rehabilitation extends until the first cover crop is well established.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement. ❖ Implement the Stormwater Management Plan, appended to this document. ❖ Divert storm water around the topsoil heaps and mining areas to prevent erosion. ❖ Control all drainage from the project area to prevent off-site pollution, flooding, or damage to infrastructure downstream of any storm water discharge points. ❖ Use silt traps where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas. ❖ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	<u>Mining, Biodiviersity and Groundcover:</u> ❖ Infestation of the topsoil heaps and mining area with invader plant species. ❖ Infestation of the denuded areas with invader plant species. ❖ Infestation of the reinstated area with	❖ Designated team to cut or pull-out invasive plant species that germinated on site.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Implement an invasive plant species management plan at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA, 2004. Do weed/alien clearing on an ongoing basis throughout the life of the mining activities. ❖ Keep all stockpiles free of invasive plant species.	Throughout the site establishment-, and operational phase. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	invader plant species.		❖ Control declared invader or exotic species on the rehabilitated areas.	
❖ Site establishment	<u>Terrestrial Fauna:</u> ❖ Potential impact on terrestrail fauna within the footprint area.	❖ Toolbox talks to educate employees how to handle fauna that enter the work areas. ❖ Contact number of a snake catcher and/or other faunal specialists.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Ensure no fauna is caught, killed, harmed, sold, or played with. ❖ Remove any fauna directly threatened by the operational activities to a safe location. ❖ Provide environmental induction to all personnel regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers to report any animals that may be trapped in the working area. ❖ Prevent the setting of snares or raiding of nests for eggs or young. ❖ Restrict the speed of all vehicles (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. ❖ Prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ❖ Do not handle or antagonise any dangerous fauna (snakes, scorpions, etc.) that are encountered during construction. Contact a suitably qualified person(s) to remove the animals to safety.	Applicable throughout site establishment-, and operational phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Do not throw or leave litter, food, or other foreign material around the site. Place this in demarcated rubbish and litter areas that are animal proof. ❖ Obtain the opinion and guidance of a suitably qualified person should any bats be noted in any of the mining areas. ❖ Demarcate the mining activities with beacons rather than fences to allow free movement of roaming species. ❖ Restrict all mining operations to daylight hours.	
❖ Site establishment. ❖ Processing, stockpiling and transporting material from site.	<u>Air Quality and Noise Ambiance:</u> ❖ Dust nuisance as a result of the site establishment. ❖ Dust nuisance as a result of the mining activities.	❖ Dust suppression equipment such as a water car. ❖ Signage that clearly reduce the speed on the access roads. ❖ Cover crop to re-vegetate denuded areas.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Control the liberation of dust into the surrounding environment using; inter alia, water spraying and/or other dust-allaying agents. ❖ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. ❖ Limit speed on the access roads to 40 km/h to prevent the generation of excess dust. ❖ Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. ❖ Flatten loads to prevent spillage and windblown dust during transportation. ❖ Consider weather conditions upon commencement of daily operations. Limit operations during very windy periods.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Monthly compliance monitoring by dust monitoring contractor. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Ensure dust-generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). ❖ Implement best practice measures during the stripping of topsoil, loading, and transporting of the mineral from the site to minimize potential dust impacts.	
❖ Site establishment. ❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	<u>Air Quality and Noise Ambiance:</u> ❖ Noise nuisance because of the site establishment activities. ❖ Noise nuisance because of the mining activities. ❖ Noise nuisance because of the decommissioning activities	❖ Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy condition in terms of the National Road Traffic Act, 1996. ❖ Work schedule to adhere to allowable work hours.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Ensure that employee and visitors to the site conduct themselves in an acceptable manner while on site. ❖ Do not permit loud music at the mining area. ❖ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. ❖ Implement best practice measures to minimise potential noise impacts. ❖ Appoint a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be done in accordance with the SANS10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Quarterly reporting by a qualified occupation hygienist. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
❖ Winning of sand – from the floodplain/riparian area ❖ Winning of sand – from the riverbed ❖ Processing, stockpiling and transporting material from site. ❖ Cumulative Impacts	<u>Hydrology, Geohydrology and Groundcover (including wetlands)</u> ❖ Modification of geomorphology. ❖ Loss of some of the riparian vegetation. ❖ Contributing towards increased sedimentation of the aquatic and riparian habitat. ❖ Increased sediment leads to the sedimentation of unique bedrock communities. ❖ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community. ❖ Causing local modification and	❖ Closure Plan. ❖ Stormwater Management Plan. ❖ Water Quality and Aquatic Habitat Monitoring Plan.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Do not change, dam, or divert the flow of the river without prior authorisation from the Department of Water and Sanitation (DWS). ❖ Do not allow activities to take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. ❖ Always adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities. ❖ Do not store any equipment within the riverbed. ❖ Establish a 38 m buffer and maintain as no-go area around the river channel, wetland conditions (marginal- and lower zones), lateral streams, and backwater wetlands. Floodplain/riparian area mining, and processing must be established outside the 38 m buffer area. ❖ Limit excavations to the mining of a maximum of two minor areas, supported by one processing area at any given time. ❖ Once an area is mined, rehabilitate it prior to the opening of a consecutive minor area. ❖ Only use one sand pump, including infrastructure and access road, at any time and rehabilitate the area immediately after moving the pump to another location along the site.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Biannual water quality monitoring by a qualified specialist. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	de-stabilisation of the bank. ❖ Loss of mining equipment due to unexpected flooding. ❖ Loss of mining equipment due to unexpected flooding ❖ Flooding of the area during large floods ❖ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river. ❖ Residual impact on the flow regime of the Sand River ❖ Combined impact on the flow regime of the river		❖ Carefully select the entrance point into the river to minimise disturbance of the marginal zone and avoid the steep banks of the river. Clearly demarcate the entrance to prevent sprawling. ❖ Adequately rehabilitate, including re-instatement of the natural topography, replacement of topsoil, prevention of erosion and monitoring and eradication of problematic weeds and invasives, any disturbance of the riverbank. ❖ Keep the removal of vegetation to a minimum where disturbance of the banks or floodplain takes place. ❖ Arrange that an appropriately qualified specialist conduct a walk-through inspection to identify any sensitive and/or protected plants that may have to be relocated before any vegetation is removed. Special focus must be placed on species such as *Ammocharis coranica, Crinum bulbispermum, Kniphofia ensifolia*. If needed, apply for plant relocation/destruction permits, and filed on site for auditing purposes. ❖ Implement adequate storm water management measures including diverting storm- and floodwater around the stockpile and excavation areas and preventing sediment and silt from entering the river. ❖ Take necessary precautions to ensure that floodwaters are diverted around the processing/stockpile- and excavation areas by means of berms. ❖ Endeavour to re-instate a geomorphology which will form part of a functional system and refrain from leaving open excavations or pits upon rehabilitation. ❖ Follow a comprehensive monitoring programme to quantify impacts and recommend mitigation. Such monitoring must include quarterly water quality sampling, sediment release (turbidity), Index of Habitat Integrity and SASS5 or a combination thereof.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Implement continued bi-annual monitoring of the habitat, macro-invertebrate, and fish communities at the reference sites, which vary seasonally.	
❖ Winning of sand – from the floodplain/riparian area ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscapting (medium- & long terrm).	<u>General</u> ❖ Potential soil contamination from hydrocarbon- and other spills. ❖ Potential impact associated with littering and hydrocarbon spills. ❖ Potential impact associated with litter/hydrocarbon spills left at the mining area.	❖ Sealed drip trays. ❖ Formal waste disposal system with waste registers. ❖ Covered refuse bins. ❖ Oil spill kit. ❖ Closed system septic tank.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Ensure regular vehicle maintenance, repairs and services only take place at the workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal. ❖ Provide all employees with ablution facilities. Ensure that the toilet is placed outside the 1:100-year floodline of the river. ❖ Ensure all ablution facilities drain into a septic tank with closed system. Do not install french drains on site. ❖ Ensure that the use of any temporary, chemical toilet facilities does not cause pollution to water sources or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. ❖ If a diesel bowser is used on site, always equip it with a drip tray. Ensure that drip trays are used during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. ❖ Clean drip trays after use. Do not use dirty drip trays.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. ❖ Should spillage occur, such as oil or diesel leaking from a burst pipe, collect the contaminated soil, within the first hour of occurrence, in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. ❖ Compile a waste management plan that focus on the waste hierarchy of the NEM:WA and implement it on site. ❖ Contain all general waste in marked, sealable, refuse bins placed at a designated area, to be removed when filled to a recognised general waste landfill site. ❖ Prevent the burning or burying of waste on site. ❖ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS and other relevant authorities.	
❖ Winning of sand – from the floodplain/riparian area	<u>Cultural and Heritage Environment:</u> ❖ Potential impact on areas/infrastructure of heritage or cultural concern.	❖ Contact number of an archaeologist & palaeontologist that can be contacted when a discovery is made on site.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Confine all mining to the development footprint area. ❖ Implement the following change find procedure when discoveries are made on site: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. ❖ Implement the Fossil Chance Find Procedure, proposed in this document, should fossils be uncovered.	
❖ Processing, stockpiling and transport of material from site	<u>Existing Infrastructure:</u> ❖ Deterioration of the access road to the mining area. ❖ Overloading of trucks having an impact on the public roads.	❖ Earthmoving equipment to maintain the gravel pavement structure of the road. ❖ Road signage to control traffic speed. ❖ Proof of load weights to prevent overloading.	<u>Role:</u> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ❖ Divert storm water around the access road to prevent erosion. ❖ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. ❖ Repair rutting and erosion of the access road caused as a direct result of the mining activities.	Applicable throughout operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			❖ Prevent the overloading of the truck and file proof of load weights for auditing purposes.	
❖ Site establishment. ❖ Winning of sand – from the floodplain/riparian area. ❖ Winning of sand – from the riverbed. ❖ Processing, stockpiling and transporting material from site. ❖ Sloping and landscaping (medium- & long term).	General: ❖ Management of health and safety aspects on site.	❖ Stocked first aid box. ❖ Level 1 certified first aider. ❖ All appointments in terms of the Mine Health and Safety Act, 1996.	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Responsibility: ❖ Ensure adequate ablution facilities and water for human consumption is daily available on site. ❖ Ensure that workers have access to the correct PPE as required by law. ❖ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	Applicable throughout decommissioning phase. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
❖ Sloping and landscaping (medium- & long term).	Topography: ❖ Landscaping of Mining Area	❖ Earthmoving equipment to reinstate mined areas.	Role: ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Responsibility: ❖ Implement progressive rehabilitation as prescribed in the closure plan, appended to this document, through-out the operational- and decommissioning phases of the project.	Applicable throughout site establishment-, operational-, and decommissioning phases. ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

l) Indicate the frequency of the submission of the performance assessment report.

An Environmental Audit Report in accordance with Appendix 7 as prescribed in Regulation 34 of the EIA Regulations, 2014 (as amended) will annually be submitted to DMRE for compliance monitoring purposes or in accordance with the frequency stipulated by the Environmental Authorisation.

m) Environmental Awareness Plan

i) Manner in which the Applicant intends to inform his or her employees of any environmental risk which may result from their work.

Once the Applicant receives the mining right and may commence with the proposed activity, a copy of the Environmental Impact Assessment Report and Environmental Management Programme will be handed to the site manager for his perusal. An induction meeting will be held with the mining related employees (operator & management) to inform them of the Basic Rules of Conduct about the environment.

ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The operations manager must ensure that he/she understands the EIAR & EMPR document and its requirement and commitments before any mining takes place.

An independent Environmental Control Officer must annually check compliance of the mining activity to the management programmes described in the EMPR. The management objectives listed in the EIAR under *Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* must be always implemented.

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst preforming their tasks.

- **<u>Site Management:</u>**
  - Stay within boundaries of site – do not enter adjacent properties
  - Keep tools and material properly stored
  - Smoke only in designated areas
  - Use toilets provided – report full or leaking toilets

- **Water Management and Erosion:**
  - Check that rainwater flows around work areas and are not contaminated
  - Report any erosion
  - Check that dirty water is kept from clean water

- **Waste Management:**
  - Take care of your own waste
  - Place waste in containers and always close lid
  - Don't burn waste
  - Pick-up any litter laying around

- **Hazardous Waste Management (Petrol, Oil, Diesel, Grease)**
  - Never mix general waste with hazardous waste
  - Use only sealed, non-leaking containers
  - Keep all containers closed and store only in approved areas
  - Always put drip trays under vehicles and machinery
  - Empty drip trays after rain
  - Stop leaks and spills, if safe
    - ✓ Keep spilled liquids moving away
    - ✓ Immediately report the spill to the site manager/supervision
    - ✓ Locate spill kit/supplies and use to clean-up, if safe
    - ✓ Place spill clean-up wastes in proper containers
    - ✓ Label containers and move to approved storage area
- **Discoveries:**
  - Stop work immediately
  - Notify site manager/supervisor
  - Includes – Archaeological finds, Cultural artefacts, Contaminated water, Pipes, Containers, Tanks and drums, Any buried structures

- **Air Quality:**
  - Wear protection when working in very dusty areas
  - Implement dust control measures:
    - ✓ Water all roads and work areas according to instructions
    - ✓ Minimize handling of material
    - ✓ Obey speed limit and cover trucks

- **Driving and Noise:**
  - Use only approved access roads
  - Respect speed limits
  - Only use turn-around areas – no crisscrossing through undisturbed areas
  - Avoid unnecessary loud noises
  - Report or repair noisy vehicles

- **Vegetation and Animal life:**
  - Do not remove any plants or trees without approval of the site manager
  - Do not collect firewood
  - Do not catch, kill, harm, sell or play with any animal, reptile, bird, or amphibian on site
  - Report any animal trapped in the work area
  - Do not set snares or raid nests for eggs or young

- **Fire Management:**
  - Do not light any fires on site, unless contained in a drum at demarcated area
  - Put cigarette butts in a rubbish bin
  - Know the position of firefighting equipment
  - Report all fires
  - Don't burn waste or vegetation

n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

The Applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMRE for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

2. UNDERTAKING

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&AP's; ☒
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; ☒

Signature of the environmental assessment practitioner:

Greenmined Environmental (Pty) Ltd

Name of Company:

14 July 2022

Date:

UNDERTAKING

I,…Machiel Treblanche du Plessis……the undersigned and duly authorised thereto by……*Vegablox (Pty) Ltd*……

Company / ~~Closed Corporation / Municipality or Council~~
(Delete whichever is not applicable)

hereby undertake to implement all the aspects contained in the ~~BAR and EMPR~~ / EIA and EMPR and accept full responsibility therefore.
(Delete whichever is not applicable)

SIGNED at ..Theunissen…… this …13th…… day …July…… 2022

_____
SIGNATURE

WITNESSES:

1……..

2……..

Official use

APPROVAL

Approved in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended.

SIGNED at …… this …… day …… 2022

_____

REGIONAL MANAGER

FREE STATE

-END-

APPENDIX A

REGULATION 2(2) MINE PLAN

APPENDIX B

LOCALITY MAP

APPENDIX C

SITE ACTIVITIES MAP

APPENDIX D

SURROUNDING LAND USE MAP

APPENDIX E

REHABLITATION MAP

APPENDIX F1

COMMENTS AND RESPONSE REPORT

APPENDIX F2

PROOF OF PUBLIC PARTICIPATION

APPENDIX G

WETLAND AND RIPARIAN ASSESSMENT

APPENDIX H

AQUATIC ASSESSMENT

APPENDIX I

STORMWATER MANAGEMENT PLAN

APPENDIX J

HERITAGE IMPACT ASSESSMENT (INCLUSIVE OF THE DESKTOP PALAEONTOLOGICAL REPORT)

APPENDIX K

SOCIAL AND LABOUR PLAN

APPENDIX L

INVASIVE PLANT SPECIES MANAGEMENT PLAN

APPENDIX M

SUPPORTING IMPACT ASSESSMENT

ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, herewith please receive an environmental impact statement that summarises the impact that the proposed mine may have on the environment after the management and mitigation of impacts have been considered, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
Site Establishment:	**Duration of site establishment phase**		
♦ Loss of agricultural land for duration of mining.	**(±1 month)**	**Definite**	**Low-Medium Concern**
♦ Visual intrusion because of site establishment.		**Low Possibility**	**Low Concern**
♦ Loss of topsoil and fertility during site establishment.		**Low Possibility**	**Low Concern**
♦ Infestation of topsoil heaps and mining area with invader plant species.		**Low Possibility**	**Low Concern**
♦ Potential impact on terrestrial fauna within the footprint area.		**Low Possibility**	**Low Concern**
♦ Dust nuisance because of the site establishment activities.		**Low Possibility**	**Low Concern**
♦ Noise nuisance because of the site establishment activities.		**Low Possibility**	**Low Concern**
♦ Work opportunities to 16 local residents **(Positive Impact)**		**Definite**	**Medium-High (+)**
Winning of Sand – from the Floodplain/Riparian Area:	**Duration of operational phase**		
♦ Modification of geomorphology.		**Highly Likely**	**Medium Concern**
♦ Loss of some of the riparian vegetation.		**Definite**	**Medium Concern**
♦ Contributing towards increased sedimentation of the aquatic and riparian habitat.		**Possible**	**Medium Concern**
♦ Causing local modification and de-stabilisation of the bank.		**Possible**	**Medium Concern**
♦ Potential soil contamination from hydrocarbon- or other spills.		**Low Possibility**	**Low Concern**
♦ Noise nuisance because of the mining activities.		**Low Possibility**	**Low Concern**
♦ Potential impact on areas/infrastructure of heritage or cultural concern.		**Low Possibility**	**Low Concern**
♦ Loss of mining equipment due to unexpected flooding.		**Low Possibility**	**Low Concern**
Winning of Sand – from the Riverbed:	**Duration of operational phase**		
♦ Modification of geomorphology.		**Highly Likely**	**Medium Concern**
♦ Affecting the aquatic fauna dependant on the sandy habitat and/or loss of aquatic habitat in the river.		**Possible**	**Medium Concern**
♦ Causing local medication of the bank.		**Possible**	**Medium Concern**
♦ Potential impact on local and downstream water quality and –users.		**Low Possibility**	**Low-Medium Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
♦ Loss of mining equipment due to unexpected flooding.		**Low Possibility**	**Low Concern**
Processing, Stockpiling and Transporting Material from Site:	**Duration of operational phase**		
♦ Flooding of the area during large floods.		**Possible**	**Low-Medium Concern**
♦ Dust nuisance because of the mining activities.		**Low Possibility**	**Low Concern**
♦ Noise nuisance because of the mining activities.		**Low Possibility**	**Low-Medium Concern**
♦ Potential impact associated with littering and hydrocarbon spills.		**Low Possibility**	**Low Concern**
♦ Infestation of denuded areas with invader plant species.		**Low Possibility**	**Low Concern**
♦ Deterioration of the access road to the mining area.		**Low Possibility**	**Low Concern**
♦ Overloading of trucks having an impact on the public roads.		**Low Possibility**	**Low Concern**
Sloping and Landscaping (Medium- & Long Term):	**Duration of decommissioning phase**		
♦ Erosion of returned topsoil and/or riverbanks after rehabilitation.		**Possible**	**Low Concern**
♦ Residual impact on the flow regime of the Sand River.		**Low Possibility**	**Low Concern**
♦ Infestation of the reinstated area with invader plant species.		**Low Possibility**	**Low Concern**
♦ Noise nuisance because of the decommissioning activities.		**Low Possibility**	**Low Concern**
♦ Potential impact associated with litter/hydrocarbon spills let at the mining area.		**Low Possibility**	**Low Concern**
♦ Return of the mined areas to agricultural use **(Positive Impact).**		**Definite**	**Medium-High (+)**
Cumulative Impacts:	**Duration of operational phase**		
♦ Increased sediment leads to the sedimentation of unique bedrock communities.		**Possible**	**Low-Medium Concern**
♦ Increased sediment leads to decrease in instream and marginal macrophytes and impacts on the aquatic community.		**Possible**	**Medium Concern**
♦ Combined impact on the flow regime of the river.		**Possible**	**Medium Concern**

APPENDIX N

CLOSURE PLAN

APPENDIX O

FINANCIAL AND TECHNICAL COMPETENCE REPORT

APPENDIX P

PHOTOGRAPHS OF THE STUDY AREA

PHOTOGRAPHS OF THE PROPOSED MINING AREA	
	
	
Photos of the Sand River	
	
Photos of the adjacent vegetated areas	

APPENDIX Q

CV AND EXPERIENCE OF EAP