ZANDBERG SANDPUT (PTY) LTD

PORTION 4 OF THE FARM ZANDBERG FONTEIN NO 97

ROBERTSON MUNICIPAL DISTRICT

WESTERN CAPE PROVINCE

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

DEPARTMENTAL REFERENCE NUMBER:

WC 30/5/1/2/2/87 MR & WC 30/5/1/2/2/10080 MR

OCTOBER 2020

PREPARED FOR:

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EXECUTIVE SUMMARY

Zandberg Sandput (Pty) Ltd submitted a Section 102 amendment application to add 108.3851 ha to the current 17.6826 ha mining footprint over Portion 4 of the farm Zandberg fontein No 97 in the Robertson area of the Western Cape Province. The S102 application necessitates an application for a Part 2 amendment of the mine's EMPR in terms of GNR 326 Section 31. The S102 application further constitute listed/specified activities in terms of the NEMA: EIA Regulations, 2014 (as amended) and therefore requires an environmental impact assessment (EIA).

Zandberg Sand Mine

The Zandberg Sand Mine operated under an old order mining permit (Reference No: MP 39/98) that was converted to a new order mining right (Protocol No: 1435) in terms of Item 7 of Schedule 2 of the MPRDA, 2002 in March 2011. This mining right (7.4826 ha) was valid until February 2016, upon which a renewal application was lodged with the DMRE. The mining right was subsequently renewed until May 2047. In 2014, the MR Holder applied for a 10.2026 ha extension of the approved 7.4826 ha mining area that was granted in December 2018. In November 2018, the mining right was ceded from WJ Viljoen to Zandberg Sandput (Pty) Ltd that is the current MR holder.

The mining activity entails the direct mining of blocks/strips of sand of ±0.25 m² in size. The topsoil is stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand is then removed from the stripped area with a front-end-loader that loads it directly onto the trucks of clients. Mined-out strips are rehabilitation as mining progress into new areas, with no more than two strips (±0.5 ha) open at any given time.

Section 102 Application

Zandberg Sandput (Pty) Ltd submitted an application for consent of the minister to extend the existing mining right footprint of the Zandberg Sand Mine with 108.3851 ha, in terms of Section 102 of the MPRDA, 2002. Should the S102 application be approved, mining will advance into the extension area as the current mining footprint (±17.7 ha) is mined-out. The mining method will remain the same as the method currently implemented by the MR holder, and no infrastructure will be established in the extension area.

Alternatives:

Initially, the project team identified one site alternative with a possibility of various layout alternatives that were assessed during the EIA process. Upon receipt of the specialist studies,

Layout Alternative 1 (LA1) was identified as the preferred alternative as it will allow the MR Holder to extend the mining area while still protecting the most sensitive areas on the property. LA1 entails the mining of an approximate area of 27 ha within the proposed ±108 ha extension area, while the remaining area is protected as a no-go area.

Public Participation Process:

Regulation 32(1)(a)(aa) of the NEMA: EIA Regulations, 2017 stipulates that an applicant (for a Part 2 amendment) must submit a report reflecting the changes to the EMPR that has been subjected to a public participation process. In light of this, the initial public participation process informed the stakeholders and I&AP's of the project and allowed for a commenting period until 02 March 2020. The comments received were incorporated into the Draft Scoping Report ((DSR) that was circulated for public commenting until 17 July 2020. The comments received on the DSR was incorporated into the Final Scoping Report that was submitted to the DMRE for approval.

Upon approval of the Final Scoping Report, this report the Draft Environmental Impact Assessment Report (DEIAR) and Environmental Management Programme (EMPR) was compiled that will be circulated for public comment for a 30-day commenting period ending 30 November 2020. The comments received on the DEIAR & EMPR will be incorporated into the final EIA & EMPR to be submitted for decision making to DMRE.

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 extension of the mining area are as follows:

Visual Characteristics:

- The footprint of S1 is mainly visible from the north-east to the south-west within an approximate area of 3-4 km from the mining area. Within close proximity the mining area is/will be visible from the neighbouring La Chasseur/Agter-Kliphoogte road.

- The viewshed analysis of LA1 shows that the mining operation/effect will be hidden from the south/south-western side of the farm and surrounding environment.
- The small scale of the proposed operation (±0.5 ha affected at a time), proposed progressive rehabilitation, as well as the fact that no infrastructure will be established assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine.

Air and Noise Quality:

- The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

Hydrology:

- The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998.

- The wetland report (WATSAN 2016) concluded that the impact of the Zandberg sand mine on the infiltration of groundwater is small and that the effect on the entire aquifer will hardly be noticed. The study further confirmed that no natural wetlands were present within the approved mining area.

- The MR Holder proposes to mine the sand resource up to the underlying sandstone layer that gradually inclines up the hill. The sandstone layer will be the limiting depth of the proposed mining activity. In order to avoid impacting on infiltration, groundwater recharge and flow, the Department of Water and Sanitation (DWS) generally stipulates that sand mining not be allowed within 1.5 m of the groundwater level. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from the proposed extension area will intercept (or come within 1.5 m) the groundwater layer.

Biodiversity Conservation Areas:

- Should LA1 be approved, the loss of vegetation will according to the botanist not affect the conservation targets, compromise the ecological functioning of the larger “natural” environment, or disrupt the connectivity of the landscape for fauna and flora or impair their ability to respond to environmental fluctuations.

Vegetation:

- According to the Botanical Study and Assessment, the northern section of the site (±27 ha – LA1) can be regarded as acceptable loss to the development as this area covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. The remaining southern area (±81 ha) will be set aside to function as a biodiversity offset area that will form part of the mine's compliance obligations.

Cultural and Heritage Environment:

- The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

Socio-Economic Environment:

- The proposed extension of the mining area will not require an increase in the number of employees.
- The Local Economic Development project allocated to Zandberg Sandput (Pty) Ltd and approved by the municipality is the installation of block paving/cement slabs at the Willem Buchaltz School, La Chasseur Robertson.

Existing Infrastructure:

- Apart from the power line that follows the La Chasseur/Agter-Kliphoogte road just inside the farm boundary, no other infrastructure has been established on the property that can be affected by the proposed extension development.

Land Use:

- Mining will temporarily affect ±27 ha of the earmarked property.
- The mine will continue with the progressive rehabilitation of mined out areas to in the end restore the entire mining footprint to an area with indigenous vegetation that can once again be zoned for agriculture.

During the environmental impact assessment process the feasibility of the proposed activity 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 Layout Alternative 1 be approved and 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 damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 62 592.83. The MR Holder currently has a financial guarantee to the value of R 110 000 lodged with the DMRE that will remain in place for the duration of the mining period.

LIST OF ACRONYMS

ART	Antiretroviral Therapy
ASTM	American Society for Testing and Materials
BGCMA	Breede-Gouritz Catchment Management Agency
BID	Background Information Document
BSA	Botanical Study and Assessment
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Areas
CN	CapeNature
CWDM	Cape Winelands District Municipality
DAFF	Department of Agriculture, Forestry and Fisheries
DD	Data Deficient
DEA&DP	Department of Environmental Affairs and Development Planning
DEDT	Department of Economic Development and Tourism
DEIAR	Draft Environmental Impact Assessment Report
DMRE	Department of Mineral Resources and Energy
DoL	Department of Labour
DRDLR	Department of Rural Development and Land Reform
DSD	Department of Social Development
DSR	Draft Scoping Report
DTPW	Department of Transport and Public Works
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme
EN	Endangered
ENPAT	Environmental Potential Atlas for South Africa
ESA	Early Stone Age
FEIAR	Final Environmental Impact Assessment Report
FEL	Front-End-Loader
FEPA	Freshwater Ecosystem Priority Area
GDP	Gross Domestic Product
GNR	Government Notice Number
HIA	Heritage Impact Assessment

HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
LA1	Layout Alternative 1
LA2	Layout Alternative 2
LC	Least Concern
LED	Local Economic Development
LLM	Langeberg Local Municipality
LSA	Later Stone Age
MHSA	Mine Health and Safety Act, 1996 (Act No 29 of 1996)
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)
MR	Mining Right
MR Holder	Zandberg Sandput (Pty) Ltd
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)
NID	Notice of Intend to Develop
NPAES	National Protected Areas Expansion Strategy
NRTA	National Road Traffic Act, 1996 (Act No 25 of 1999)
NT	Near Threatened
NWA	National Water Act, 1998 (Act No 36 of 1998)
OHSA	Occupational Health and Safety Act, 1993 (Act No 85 of 1993)
OSL	Optically Stimulated Luminescence
PCB's	Polychlorinated Biphenyls
PCO	Pest Control Officer
PPE	Personal Protection Equipment
PSM	Palaeontological Sensitivity Map
S1	Site Alternative 1
S102	Section 102 Application in terms of the MPRDA, 2002
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
SLP	Social and Labour Plan
SOP	Standard Operational Procedure
VU	Vulnerable
WCBSP	Western Cape Biodiversity Spatial Plan
WCNCO	Western Cape Nature Conservation Ordinance, 1974 (No 19 of 1974)

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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:	Zandberg Sandput (Pty) Ltd
TEL NO:	023 626 1836
FAX NO:	-
POSTAL ADDRESS:	P.O. Box 717, Robertson, 6705
PHYSICAL ADDRESS:	Zandberg Fontein Farm, Robertson
FILE REFERENCE NUMBER SAMRAD:	WC30/5/1/2/2/87MR & WC30/5/1/2/2/10080MR

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 taken into account 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 aforementioned Act. Zandberg Sandput (Pty) Ltd (hereafter referred to as the "MR Holder") appointed Greenmined Environmental (Pty) Ltd (hereafter referred to as "Greenmined") to undertake the study needed. Greenmined has no vested interest in Zandberg Sandput (Pty) Ltd or the proposed project and declares its independence as required by the EIA Regulations, 2014 (as amended 2017).

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 S.

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

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

b) Description of the property

Table 1: Description of the property.

Farm Name:	Portion 4 of the farm Zandberg fontein No 97
Application area (Ha)	⋉ Approved MR area: 17.6826 ha ⋉ Section 102 Application Area: 108.3851 ha ⋉ Total MR area: 126.0677 ha
Magisterial district:	Robertson
Distance and direction from nearest town	The Zandberg Sand Mine is located ±7 km south-west of Robertson.
21 digit Surveyor General Code for each farm portion	C06500000000097000004

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

Zandberg Sandput (Pty) Ltd submitted a Section 102 ("S102") amendment application to add 108.3851 ha to the current 17.6826 ha mining footprint. The S102 application necessitates an application for a Part 2 amendment of the mine's EMPR in terms of GNR 326 Section 31. The S102 application further constitute listed/specified activities in terms of the NEMA: EIA 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 extension area.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the proposed S102 amendment 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 Section 102 MPRDA, 2002 amendment of the mining right.	126.0677 ha	X	GNR 324 LN 3 Activity 12 GNR 325 LN 2 Activity 15, 17 GNR 327 LN 1 Activity 28
GNR 324 Listing Notice 3 Activity 12: *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *i. Western Cape* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans;*			
GNR 325 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.*			
GNR 325 Listing Notice 2 Activity 17: *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—* *(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or* *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;* *but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.*			

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
GNR 327 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;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Demarcation of the extension area with visible beacons.	108.3851 ha	N/A	Not listed
Stripping and stockpiling of topsoil of each mining block.	±0.25 ha/strip	X	GNR 324 LN 3 Activity 12 GNR 325 LN 2 Activity 15 GNR 327 LN 1 Activity 28
GNR 324 Listing Notice 3 Activity 12: *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *i. Western Cape* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans;*			
GNR 325 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.*			
GNR 327 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;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Excavation of sand.	±0.25 ha/strip	X	GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 28
GNR 325 Listing Notice 2 Activity 17: *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—* *(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or* *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;*			

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.			
GNR 327 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;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Replacing the topsoil upon closure of a mined-out strip.	±0.25 ha/strip	X	GNR 327 LN 1 Activity 22 GNR 327 LN 1 Activity 28
GNR 327 Listing Notice 1 Activity 22: *The decommissioning of any activity requiring –* *(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or* *(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure;* *but excluding the decommissioning of an activity relating to the secondary processing of a –* *(a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or* *(b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; –* *in which case activity 31 in this Notice applies.*			
GNR 327 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;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Final rehabilitation and closure of the site.	±0.50 ha	X	GNR 327 LN 1 Activity 22
GNR 327 Listing Notice 1 Activity 22: *The decommissioning of any activity requiring –* *(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or* *(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure;* *but excluding the decommissioning of an activity relating to the secondary processing of a –* *(a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or* *(b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; –* *in which case activity 31 in this Notice applies*			

ii) Description of the activities to by 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)

(Information obtained from the Environmental Management Programme Report of Zandberg Sand Mine, 2014)

1. BACKGROUND INFORMATION (ZANDBERG SAND MINE)

(Refer to Appendix F1: Mining Authorisations)

Sand mining commenced in the 1980's on Portion 4 of the farm Zandberg fontein No 97, Robertson. The Zandberg Sand Mine operated under an old order mining permit (Reference No: MP 39/98) that was converted to a new order mining right (Protocol No: 1435) in terms of Item 7 of Schedule 2 of the MPRDA, 2002 in March 2011. This mining right (7.4826 ha) was valid until February 2016, upon which a renewal application was lodged with the DMRE. The mining right was subsequently renewed until May 2047.

In 2014, the MR Holder applied for a 10.2026 ha extension (light blue polygon in Figure 2) of the approved 7.4826 ha mining area (dark blue polygon in Figure 2) that was granted in December 2018.

In November 2018, the mining right was ceded from WJ Viljoen to Zandberg Sandput (Pty) Ltd that is the current MR holder.

The table below lists the GPS coordinates of the current mining footprint (17.6826 ha).

Table 3: GPS coordinates of the approved mining right area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
G	33º50'41.92"	19º48'54.92"	-33.844978º	19.815256º
H	33º50'49.92"	19º48'56.52"	-33.847200º	19.815700º
I	33º50'52.18"	19º48'45.17"	-33.847827º	19.812547º
J	33º50'44.16"	19º48'43.56"	-33.845601º	19.812100º
K	33º50'42.81"	19º48'50.44"	-33.845225º	19.814011º
L	33º50'37.25"	19º48'49.99"	-33.843681º	19.813886º
M	33º50'37.92"	19º48'37.05"	-33.843867º	19.810292º
N	33º50'51.13"	19º48'38.18"	-33.847536º	19.810606º

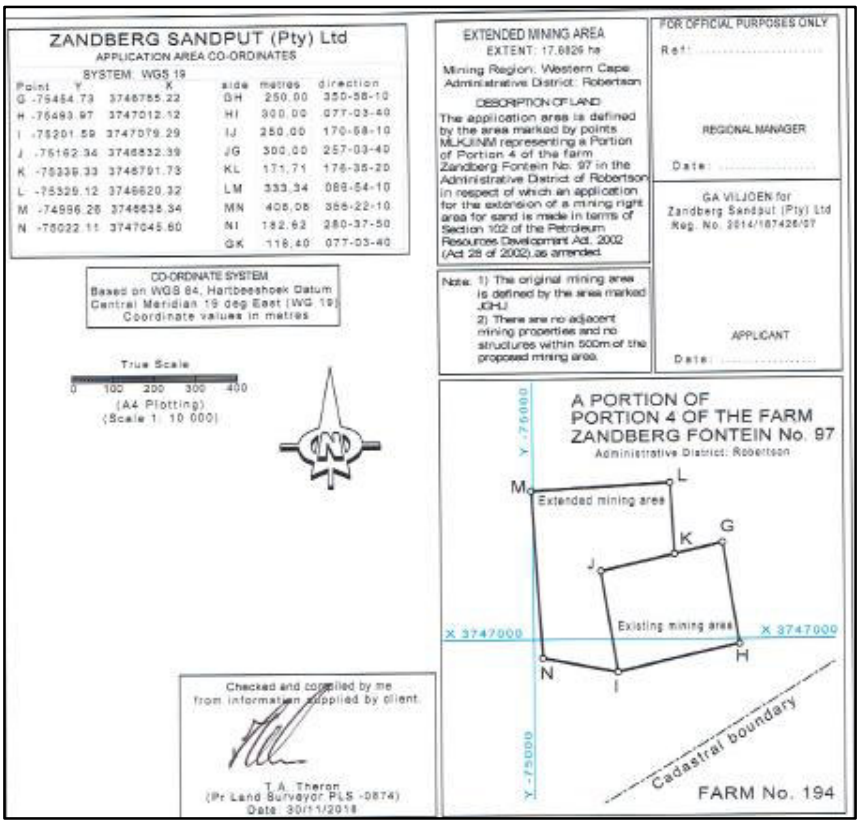


Figure 1: Cadastral map showing the approved mining footprint of Zandberg Sandput (Pty) Ltd.

Figure 2: Satellite view showing the location of the MR area in relation to the surrounding landscape, where the dark blue polygon shows the initial mining footprint, and the light blue polygon shows the approved extension area. (Image obtained from Google Earth).

1.1 CONSTRUCTION PHASE

The Zandberg sand mine has been in full production for at least 26 years, with the site establishment phase already completed in the 1980's. In light of this, no construction/development phase applies to the current operations.

1.2 PRESENT MINING OPERATIONS / OPERATIONAL PHASE

The operational phase of the mine involves the removal of the topsoil of a strip of ±0.25 ha within which the sand is mined in a block of approximately 50 x 50 m. The topsoil is stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand is then removed from the stripped area with a front-end-loader (FEL) that loads it directly onto the trucks of clients. To date every mined-out strip (±0.25 ha) was rehabilitation before work continued at the consecutive phase/strip. However lately the height of the dune increased considerably and safety requirements now dictate that the MR Holder reduce the height of the mining face. This is achieved by pushing the sand (after removal of the topsoil) down the mining face onto a section of the adjacent/most recently mined-out strip. The excavator then loads the sand from the floor of the mine onto the trucks of the clients. In light of this, the mining method now requires a maximum of two strips (±0.5 ha) to be open at any given time. As the face of the dune recedes, the mined out areas (no longer needed for the loading of sand) is rehabilitated.

1.2.1 Zoning

Langeberg Local Municipality approved an application to rezone a portion of Remainder of Portion 4 of the farm Zandberg fontein No 97 from Agricultural Zone I to Industrial Zone III (Mining) in terms of Section 60 of the Langeberg Land Use Planning Bylaw of 2015 (PN 264/2015) in March 2018. Refer to Appendix F2 for a copy of the rezoning approval.

1.2.2 Existing Infrastructure

No permanent infrastructure has been established within the mining area, and no electricity connection is needed to allow for the operation of the mine. A chemical toilet, was placed on site, that is used by the FEL operator.

The FEL is removed to the off-site workshop on the farm or the town of Robertson when maintenance and/or servicing is needed. Likewise, the mining site does not require the storage of diesel, and fueling of the FEL is done at the farm yard (off-site) or by means of a mobile diesel bowser with the use of a drip tray.

The Applicant makes use of an existing gravel road that connects with the La Chasseur/Agter-Kliphoogte road (DR1342) to access the sand mine. During the land use application (for the current MR), the Department of Transport and Public Works (DTPW) required that the necessary right of way servitude be registered regarding the access road, and that the access road be constructed as a Main Farm Access as per their standard (see Appendix H) and provided with as sealed hard-surface. The MR Holder is in the process of implementing these requirements.

1.2.3 Mine Plan

Mining commenced in the south-eastern corner of the mining area. Presently, the mining direction is towards the northern- and western boundaries of the approved footprint. The EMPR of the MR Holder mentions that at no time may there be more than 1 ha of land opened and/or in use. As shown in the figure below, the initial mining footprint (G – K / dark blue polygon) has been mined-out, and mining now extends into the approved extension area (I – N / light blue polygon). Approximately 8.6 ha (as estimated April 2020) of the approved 17.6826 ha area remains available for mining.

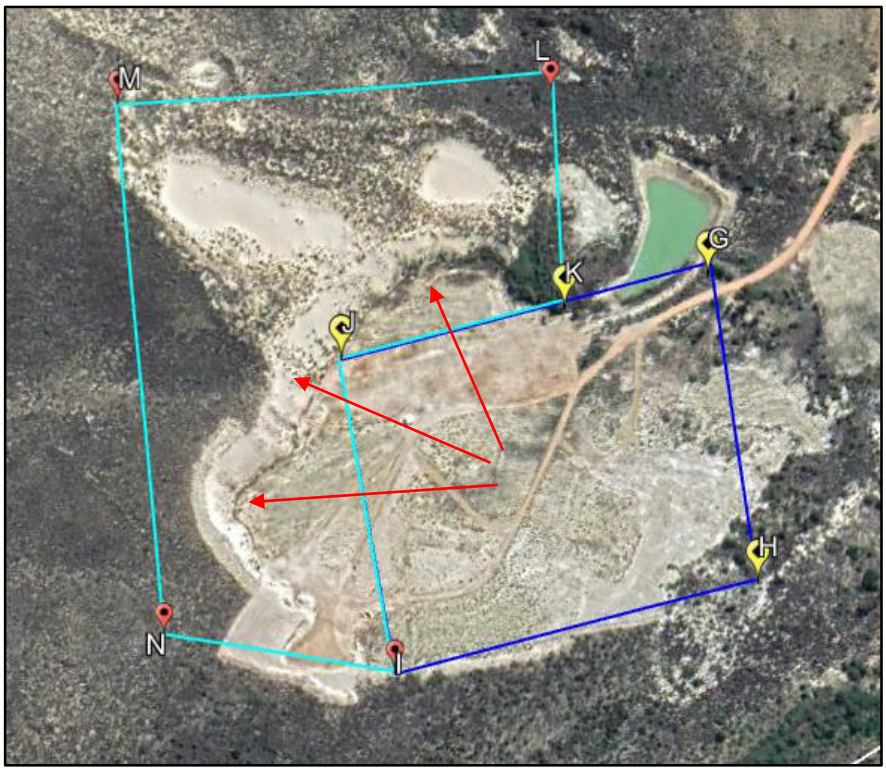


Figure 3: Satellite view showing the mined-out G – K area (dark blue polygon), as well as the area I – N (light blue polygon) that is presently being mined. The arrows indicate the mining direction. (Image obtained from Google Earth).

The material mined from the footprint is sold as building- and filling sand to the local building industry which include the towns of Robertson, Ashton and McGregor.

1.2.4 Topsoil Management

As mentioned earlier, the topsoil stripped from the area to be mined is stockpiled at the edge of the strip where it is protected until it is replaced over the mined-out area during the rehabilitation phase (medium term). Depending on market demand and the depth of the sand resource in the opened strip, topsoil is typically stored for a period of ±6 months (depending on market demand).

The MR Holder, makes use of a rehabilitation contractor that re-spreads the topsoil to an approximate depth of 300 mm upon which the reinstated area is planted with a cover crop. As topsoil isn't stored for lenghty periods, additional fertilising hasn't been necessary thus far.

1.2.5 Waste Management Programme

Due to the nature of the activity, the small scale of the operation, and the fact that no infrastructure was established or maintenance work is done within the approved mining footprint, very little to no general waste is generated as a direct result of the mining activities. Currently, the general waste of the site (such as food wrappers, water bottles etc.) is kept inside the FEL/site vehicles until it is removed, at the end of the day, to the off-site workshop where it is kept in general waste bins until it is removed to the Robertson landfill site.

Likewise, very little (if any) generation of hazardous waste is applicable to this activity. Hazardous waste could potentially result from accidental spillages or breakdowns. Such contaminated areas (when applicable) will then immediately (within first hour of the occurrence) be cleaned and the contaminated soil contained in a designated hazardous waste container that will immediately be removed to the off-site workshop. The hazardous waste will either be disposed of at a registered hazardous waste handling facility, or be collected by a registered waste handling contractor. All safe disposal certificates will be filed for auditing purposes.

The chemical toilet is serviced by a registered sub-contractor and the proof of the services are kept on file for auditing purposes.

The mine does not store any waste within the boundaries of the site, and no mining related waste is buried/burned on the farm.

1.2.6 Water Management

(Refer to Appendix G1: Water Use Authorisations as well as Appendix G2: Wetland Delineation Report)

The sand mine does not require processing water and due to the nature of the sand being mined (heavy), very little to no water is needed as dust levels are typically low. Dust generated on the access road is, as far as possible, managed through alternative dust suppression methods to minimise water use.

In 2016, the MR Holder applied for water use authorisation for activities that trigger Section 21 (c) and 21(i) of the NWA, 1998 as the mining

footprint is within 500 m of a wetland. The application was accompanied by a Wetland Delineation Report (see Appendix G2) conducted by WATSAN Africa in 2016.

The wetland report had to verify the presence or absence of a wetland within the potential mining area, as well as determine whether the wetland against the lower slope of the Zandberg mountain is indeed a valid wetland in need of protection or whether is has been artificially induced by the mining activities with little if any conservation status. The report concluded that the wet area is an anthropologically induced wetland that could perhaps be classified as “incidental” rather than “artificial”. It bears no special or any other conservation status, and that the area of the mine does not have any connectivity with the drainage line in the valley below. The report stated that since the trench is entirely artificial with an insignificant conservation status it is of no concern at all and therefore recommended that the mining (approved mining area) should go ahead.

DWS subsequently issued the General Authorisation in September 2017 and the Water Certificate was received in 2018.

(Also refer to Part A(1)(g)(iv)(1)(c) *Descripton of specific environemntal features and infrastructure on the site – Site Specific Hydrology and Geohydrology*)

1.2.7 Progressive Rehabilitation

As mentioned earlier, once a strip is mined-out the MR Holder contracts the services of a rehabilitation contractor to level the footprint and reinstate the stockpiled topsoil over the area in question (refer to 1.2.4 Topsoil Management above). To date approximately 8 ha has been rehabiliated by the MR Holder.

Also refer to *Part B(1)(d)(i) Determination of closure objectives.*

2. S102 APPLICATION

2.1 PROJECT PROPOSAL

The MR Holder submitted an application for consent of the minister to extend the existing mining right footprint of the Zandberg Sand Mine with 108.3851

ha, in terms of Section 102 of the MPRDA, 2002. The table below lists the GPS coordinates of the proposed extension area as shown on the Regulation 2(2) and Regulation 42 Mine Plans attached as Appendix A2 and A1 respectively.

Table 4: GPS coordinates of the proposed S102 extension area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
L	33º50'37.25"	19º48'49.99"	-33.843681º	19.813886º
M	33º50'37.92"	19º48'37.05"	-33.843867º	19.810292º
N	33º50'51.13"	19º48'38.18"	-33.847536º	19.810606º
I	33º50'52.18"	19º48'45.17"	-33.847827º	19.812547º
R	33º51'15.84"	19º48'03.10"	-33.854400º	19.800862º
Q	33º51'00.47"	19º47'51.75"	-33.850163º	19.797751º
P	33º50'20.73"	19º48'34.09"	-33.839014º	19.809360º

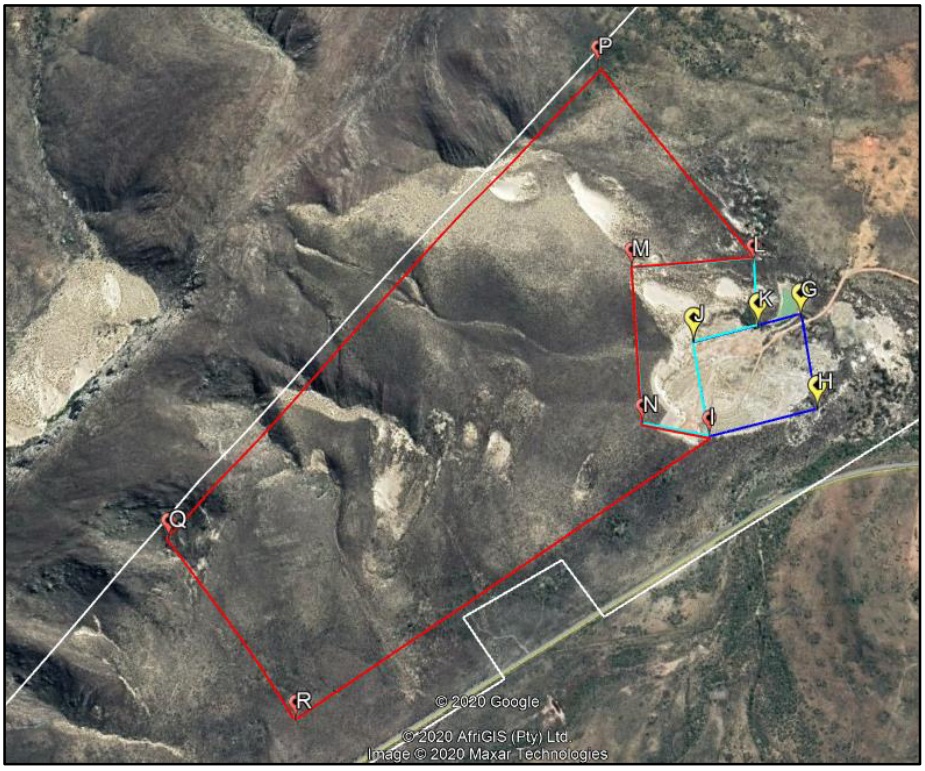


Figure 4: Satellite view showing the location of the proposed S102 extension area (red polygon) in relation to the approved MR area (blue polygons), and the surrounding landscape where the white line shows the property boundary. (Image obtained from Google Earth).

The proposed extension area will be developed over a section of the property that is zoned for agricultural purposes with a natural to near natural

vegetation cover. Should the S102 application be approved, mining will advance into the extension area (refer to Part A(1)(g)(i) *Details of the development footprint alternatives considered*) as the current mining footprint (±17.7 ha) is mined-out. The mining method will remain the same as the method currently implemented by the MR holder, and no infrastructure will be established in the extension area. As mentioned earlier, should the project be authorised the mining area will only contain one front-end-loader.

Should the S102 amendment application be granted and the mining of sand from the extension area 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 phase,* which will involve the demarcation of the extension area, the 100 m buffer zone from the drainage line, and the no-go southern area identified during the environmental impact assessment.

(2) Operational phase which will involve grading the topsoil off a ±0.25 ha strip. The topsoil will be stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand will be removed with a front-end-loader (FEL) that will load it directly onto the trucks of clients that transports it from site.

(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-out strips and the management of weeds and invasive plant species. In the long term, rehabilitation will involve final landscaping of the site, the replacement of the topsoil of the final strip and the removal of the FEL from site 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. Once the full mining area is rehabilitated, the MR 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.

2.2 SITE ESTABLISHMENT PHASE

Site establishment entails the demarcation of the extension area boundaries and identified sensitive area, as detailed below:

2.2.1 Demarcation of Mining Boundaries

(Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered – Layout Alternatives & Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – Site Specific Vegetation.)

Pursuant to receipt of an Environmental Authorisation (EA) and the Section 102 Mining Right (MR) amendment, and prior to mining, the boundary of the amended mining footprint has to be demarcated.

The northern boundary of the 100 m buffer, from the drainage line, will be clearly demarcated (refer to Figure 5), within the boundary of the mining footprint. The southern no-go area will be signposted to restrict entry into the area by any mining related personnel.

2.3 OPERATIONAL PHASE

The operational phase of the mine involves the removal of the topsoil of a strip of ±0.25 ha within which the sand is mined in a block of approximately 50 x 50 m. The topsoil is stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand is then removed from the stripped area with a FEL that loads it directly onto the trucks of clients. The MR Holder removes the sand up to the underlying sandstone layer that gradually rises up the hill and acts as the limiting depth of the mine. Due to the undulating nature of the earmarked area no single mining depth can be applied across the entire footprint. However, the MR Holder confirmed that no mining will take place into/below the sandstone layer.

Upon reaching the sandstone layer the mined-out strip is rehabilitated as work continues into the consecutive phase/strip. No more than two strips (±0.5 ha) will be open at any given time.

This method will persist as mining advances into the proposed extension area. The applicant intends to mine ±0.5 ha sand per year depending on market demand and sales.

See Figure 5 for a schematic representation of the proposed extension activity and the Site Activities Map attached as Appendix C.

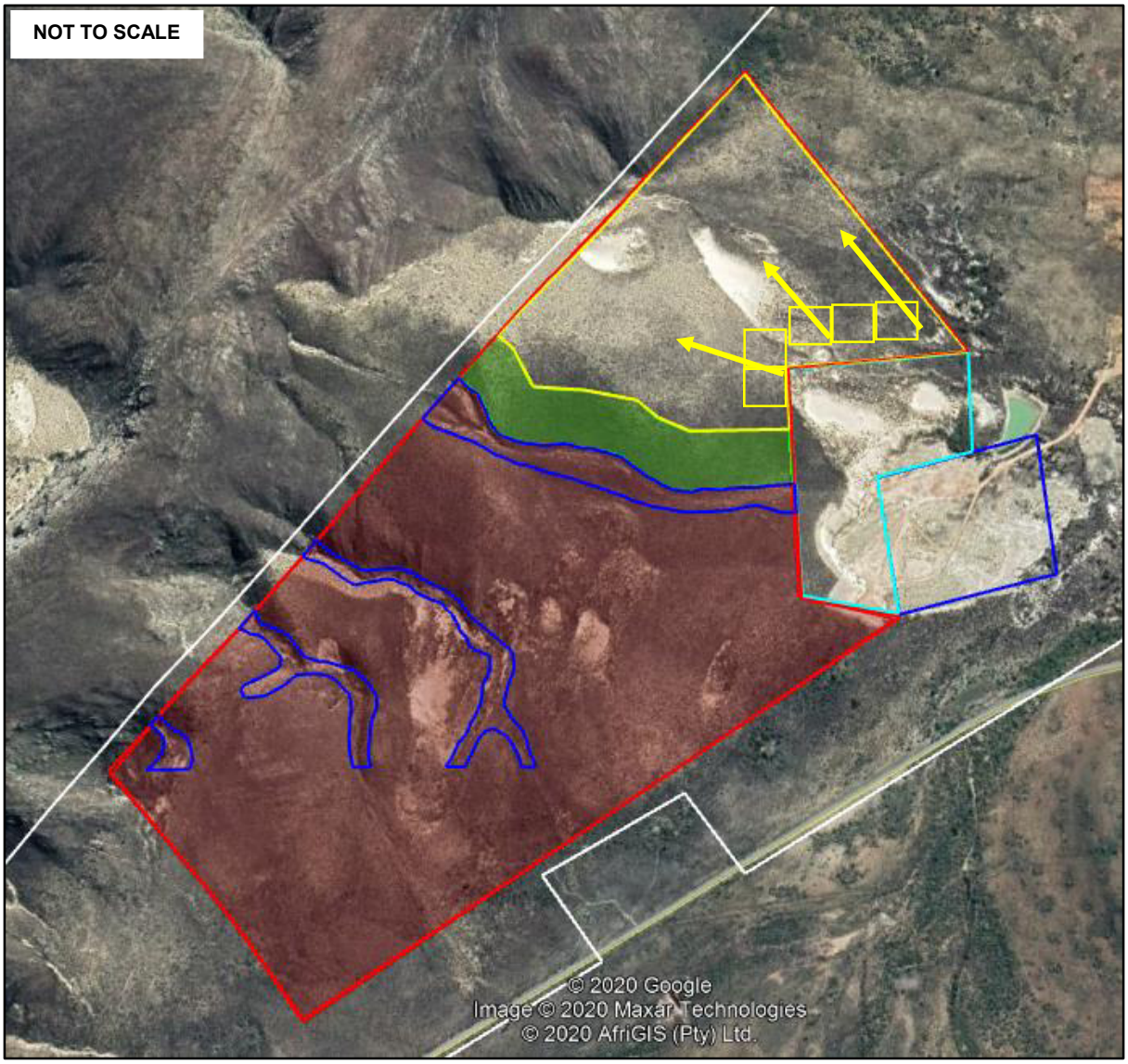


Figure 5: Schematic representation showing the proposed 0.25 ha strips (yellow blocks) in relation to the mining footprint (red polygon) where the red shaded area shows the no-go area and the green shaded area indicates the 100 m buffer zone.

2.3.1 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 Vegetation)

The proposed extension footprint (±108 ha) falls across two vegetation types known as the Breede Sand Fynbos (FFd 8) and the North Sonderend Sandstone Fynbos (FFs 13). It also extends into the Langeberg Critical Biodiversity Area (CBA1).

As the extension of the mining area will necessitate the removal of indigenous vegetation to allow access to the mineral (sand), Nkurenkuru Ecology & Biodiversity was appointed to conduct a botanical study and assessment (BSA) of the earmarked extension area. The BSA is attached as Appendix I2 to this report, and the findings and recommendation of the specialist were incorporated into the DEIAR.

As discussed in Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on the site – Site Specific Vegetation,* the northern section of the site can be regarded as acceptable loss to the development as this area (north of the prominent drainage line) covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. Subsequently this area is largely a uniform habitat type, and development within this section will not impact the status of the vegetation / ecosystem type, red data species or influence the conservation targets set out for this CBA1 area. Furthermore, by restricting mining activities to this area adjacent to the existing mining area, potential impacts are “compressed” in a confined area avoiding further habitat fracturing as well as influencing important biological corridors.

Upon receipt of the BSA, the layout of the site was finalised and the mineable area is presented as LA1 in this document. The intention of the MR holder is to minimize the removal of vegetation, and to in the end restore the mined-out footprint area to land with indigenous

vegetation.

Should LA1 be approved, the vegetation of the earmarked area will be removed with the topsoil and will therefore act as mulch to be replaced on the mined-out strips.

2.3.2 Topsoil Stripping

As mentioned earlier, the topsoil will be removed from a ±0.25 ha strip. The topsoil will be stockpiled along the edge of the strip to be replaced during the rehabilitation of the mined-out section. Topsoil stripping will entail the removal of the upper 300 mm of the soil, whether it contains sand (commodity) or not. The topsoil berms will not be driven over, contaminated, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 1.5 m in height to prevent compaction and preserve micro-organisms within the topsoil.

2.3.3 Access Road

The MR Holder will continue to makes use of the existing gravel road that leads into the current mining area, and if needed be extended into the mining area as mining progresses. 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 or no-go areas, and upon closure of the site all haul roads, no longer needed by the landowner, will be ripped and rehabilitated. As mentioned earlier, the MR holder will only commence with the proposed activity once the sand resource in the existing mining area (±17.7 ha) is depleted. In light of this, the proposed activity will not increase the current traffic demand on the area, but merely ensure the continuation of it.

2.3.4 Water Use

Dust generated on the access road will as far as possible be managed through alternative dust suppression methods to prevent

the use of water for dust suppression. These measures will include a combination of the following:

- The speed of all mining equipment/vehicles will be restrictions to 20 km/h on the internal farm roads/haul roads to minimize dust generation;
- The removal of vegetation will only be done immediately prior to the mining of an area in an attempt to lessen denuded areas (acting as dust source) to the absolute minimum.

2.3.5 Waste Management

The MR Holder will continue to manage any waste that might be generated at the mine as described earlier under 1.2.5 *Waste Management.*

2.3.6 Servicing and Maintenance

No workshop will be established within the mining footprint, and maintenance and/or servicing of the FEL will continue at the off-site workshop on the farm or the town of Robertson. 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. No fuel will be stored at the mine, and fuelling of the FEL will continue at the farm yard or by means of a mobile diesel bowser with the use of drip trays.

2.3.7 Progressive Rehabilitation

The progressive rehabilitation (medium term), currently implemented at the mine, will also be applicable to the extension area once a strip is mined-out.

Also refer to Part B(1)(d)(i) *Determination of closure objectives*.

2.4 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 and seeding of mined-out strips, and the management of

weeds and invasive plant species. In the long term, rehabilitation will involve final landscaping of the site, the replacement of the topsoil on the final strip and the removal of the FEL 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 botanist proposed species that can be planted as cover crop in the re-instatement of the mining area (see BSA attached as Appendix I2 and the Closure Plan attached as Appendix M).

The MR Holder proposed the following regarding the rehabilitation of the mined-out strips (also refer to the Closure Plan attached as Appendix M):

- The mining plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating different mining blocks progressively as mining continues.
- To ensure minimum impact on drainage, the MR Holder will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- 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 entire mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying soil. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- The MR Holder 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 will be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion.
- 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 MR Holder will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated areas. The invasive plant species management plan (Appendix K) will be implemented on site.

The future land use of the mining footprint will return to agricultural zoning. Upon the replacement of the topsoil, the area will once again be available for use by the landowner, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed end use of the mine.

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

Rehabilitation of the excavated area:

No waste may be permitted to be deposited in the mining area.

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 seed mix in order 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 (DMRE) 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.

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 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.*

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.	The mitigation measures proposed for the site includes specifications of the CARA, 1983.

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
	Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Invasive Plant Species.*	
Guideline on Need and Desirability	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.
Langeberg Local Authority Integrated Development Plan (IDP)	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed acidity – Socio-Economic Environment.	The IDP was used in the assessment of the socio economic profile of the receiving community.
Langeberg Land Use Planning Bylaw (264/2015) Langeberg Municipality – Integrated Zoning Scheme Bylaw (7929/2018)	Part A(1)(g)(iv)(1)(b) Description of current land uses. Appendix F2 – Proof of zoning approval.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg fontein No 97 in March 2018. The proposed S102 application requires a land use application to the Langeberg Local Municipality in terms of their Land Use Planning Bylaws. A town and regional planner has been appointed to commence with this application.
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. ⁎ Section 102 amendment application.	Part A(1)(d) Description of the scope of the proposed overall activity.	Application for a Section 102 amendment application submitted to the DMRE-WC. Ref No. WC30/5/1/2/2/87MR & WC30/5/1/2/2/10080MR.
National Environmental Management Act,1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended by GNR 326 effective 7 April 2017): ⁎ GNR 326 Section 31 Amendments to be applied for in terms of Part 2 ⁎ GNR 324 Listing Notice 3 Activity 12 ⁎ GNR 325 Listing Notice 2 Activity 15 ⁎ GNR 325 Listing Notice 2 Activity 17 ⁎ GNR 327 Listing Notice 1 Activity 22 ⁎ GNR 327 Listing Notice 1 Activity 28	Part A1(d)(i) Listing and specified activities.	Application for a Part 2 amendment of the EMPR as well as an EA submitted to DMRE-WC. Ref No: WC 30/5/1/2/2/87 MR & WC30/5/1/2/2/10080MR.

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
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 and Noise Quality.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Air and Noise Quality*.	The mitigation measures proposed for the site take into account 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 Conservation Areas, and Vegetation.*	Should Layout Alternative 1 be approved and the proposed mitigation measures be implemented no aspects of the project could be identified that triggers the NEM:BA, 2004. 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: *Operational phase – 2.3.5 Waste Management.* 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 take into account 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	A Notice of Intent to Develop in terms of Section 38(8) of the NHRA, 1999 was submitted to Heritage Western Cape (HWC) for commenting, and a Heritage Impact Assessment (inclusive of an archaeological- and palaeontological impact assessment) were conducted. The HIA found that the earmarked area is not a sensitive heritage environment. The mitigation measures proposed for the

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.*	site includes specifications of the NHRA, 1999.
National Road Traffic Act, 1996 (Act No. 93 of 1996)	Part A(ii) Description of the activities to be undertaken: *Operational phase – 2.3.3 Access Road.* 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 take into account 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 and Geohydrology.* Part B(1)(d)(viii) Has a water use licence been applied for?	The MR Holder has a valid General Authorisation issued by DWS in 2017 (see Appendix G1). The mitigation measures proposed for the site take into account 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.
Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013)	Part A(1)(g)(iv)(1)(b) Description of current land uses.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg fontein No 97 in March 2018. The proposed project requires a land development application to Provincial Government (DEA&DP). A town and regional planner was appointed to handle this application.
The South African Constitution.	Implied throughout the document.	To be upheld throughout the EIA assessment, planning-, construction-, operational- and decommissioning phases.
Western Cape Biodiversity Spatial Plan	Part A(1)(g)(iv)(1)(b) Description of current land uses.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg fontein No 97 in March 2018.

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
		The proposed extension area is currently zoned for agricultural use and a rezoning application will be prepared and submitted by a Town and Regional Planner.
Western Cape Noise Control Regulations (PN 200/2013), June 2013.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Air and Noise Quality*.	The mitigation measures proposed for the site take into account the Western Cape Noise Control Regulations, 2013.
Western Cape Land Use Planning Act, 2014 (Act No 3 of 2014)	Part A(1)(g)(iv)(1)(b) Description of current land uses.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg fontein No 97 in March 2018. The proposed project requires a land development application to Provincial Government (DEA&DP). A town and regional planner was appointed to handle this application.
Western Cape Nature Conservation Ordinance, 1974 (No 19 of 1974)	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 Conservation Area, and Vegetation*.	Should Layout Alternative 1 be approved and the proposed mitigation measures be implemented no aspects of the project could be identified that triggers this Ordinance. The mitigation measures proposed for the site considers the WCNCO 1974.

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).

Zandberg Sand Mine:

Sand mining commenced in the 1980's on Portion 4 of the farm Zandberg fontein No 97, Robertson. The sand of the Zandberg Sand Mine is of excellent quality and is sold to the building-, civil-, and construction industries within the Western Cape Province. The Zandberg sand is free of organic matter such as Port Jackson (*Acacia saligna*) and Redeye Wattle/Rooikrans (*Acacia cyclops*) seeds. In the building industry this is important as "contaminated" sand causes popping of

plaster when the contaminants (seeds) react with the moisture in the mixture, expand, and cause cavities in the plaster.

The mine employs one operator (excluding management) that is from the local community. In addition, thereto the implementation of the Social and Labour Plan (which is obligatory for a mining right holder) contributes positively to the socio-economic environment of the local community.

This document, the amended EIAR and EMPR, entails the second revision of the Zandberg Sand Mine's approved EMPR, with the purpose of aligning the mining documentation with the Section 102 amendment application to add ±108 ha to the current ±18 ha mining footprint.

Section 102 Amendment Application:

The MR holder identified the need to include the rest of the sand resource on the property into the approved mining area so as to ascertain and prolong the lifespan of the sand mine. The increase in building-, construction- and road maintenance projects in the vicinity of the property motivated the continued operation of the mine. The sand mine operation is of very small scale and the extension of the footprint will not necessarily increase the impact of the operation on the surrounding environment provided that strip mining continues, progressive rehabilitation is implemented and the no-go areas are maintained over sensitive botanical areas.

The need and desirability of the proposed extension 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?	As discussed under *Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity*, the Mining and Biodiversity Map shows that the proposed area extends over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. According to the 2017 WCBSP, the Langeberg CBA 1 extends across the earmarked area. Two vegetation types were identified within the study area namely the Breede Sand Fynbos (VU) and the North Sonderend Sandstone Fynbos (LC). Nkurenkuru Ecology and Biodiversity identified ±27 ha of the proposed extension area that is acceptable for mining as it will not impact the status of the vegetation / ecosystem type, red data species or influence the conservation targets set out for this CBA1 area. The layout of the proposed project was amended to correspond with the allowable area identified by the botanist. Also refer to: ⋉ Part A(1)(g)(i) Details of the development footprint alternatives considered; ⋉ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Vegetation; ⋉ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk.	Desirable
How will this development pollute and/or degrade the biophysical environment?	Due to the small scale and nature of the sand mining activity (excavation of sand with one FEL) the pollution potential is of low significance. The strip mining method ensures continued reinstatement of mined-out areas, thereby keeping the impact on the receiving environment as low as possible. Should LA1 be implemented, the loss of biodiversity was deemed acceptable by the specialist as ±81 ha will be protected as a biodiversity offset area.	

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**
What waste will be generated by this development?	The general waste generated at the mine mainly consist of items such as food wrappers and water bottles of the FEL operator. This is kept within the site vehicles and daily removed to the off-site workshop. As mentioned earlier, hazardous waste may result from accidental spillages/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 container that will immediately be removed to the off-site workshop, from where it will be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste contractor. The chemical toilet will be serviced by an accredited contractor. No waste is/will be disposed of, buried, burned or treated on the farm.	Highly Desirable
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	The MR Holder has been mining sand from the property for the past 26 years. Sand mining, on this property, however commenced in the 1980's with the surrounding areas occasionally used for grazing by the landowner. In light of this, sand mining has become a known activity of the Zandberg fontein property. However, when the footprint of the proposed extension area is placed on the PSM, it extends over areas of high concern. ACO Associates CC was appointed to conduct a Heritage Impact Assessment (see Appendix J) to determine the sensitivity of the area. The assessment found that: "*the area identified for expansion of the Zandbergfontein sand mine is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. It is our considered opinion that provided the mitigation measures set out above are implemented, the overall impact of the proposed expansion of the Zandbergfontein sand mine will be of low heritage significance and the proposed activity is acceptable*."	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**
How will this development use and/or impact on non-renewable natural resources?	The Zandberg Sand Mine sells the sand mined from the approved portion of Portion 4 of the farm Zandberg fontein No 97. Presently, it is believed that the mineable area (LA1) may have an inferred sand reserve of >1 900 000 m³. Based on the current production rate, the sand resource shows a potential life of mine of >50 years. In light of this, it is believed that the MR holder responsibly consumes the sand resource on the property.	Highly Desirable
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part?	The sand mine does not make use of electricity and very little (if any) water is needed to allow the operation of the activity.	Highly Desirable
How were a risk-averse and cautious approach applied in terms of ecological impacts?	Upon receipt of the BSA, the layout of the mineable area was finalised and the present option (LA1) allows for the mining of ±27 ha of the proposed ±108 ha extension area with the remaining ±81 ha protected as a biodiversity offset area.	Desirable
How will the ecological impacts resulting from this development impact on people's environmental right?	The mine is managed in accordance with the agricultural practices of the farm, and should LA1 be approved the potential visual-, dust-, and noise impacts associated with the proposed activity will be of very low significance. If the proposed mitigation measures and monitoring programs, as proposed in this document, is implemented, it is believed that no environmental rights of the surrounding residents/public will be affected by the ecological impacts associated with the proposed activity.	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.	Sand mining commenced in the 1980's on the farm Zandberg fontein, and the revenue generated by the mine has since then contributed as an additional source of income (compensation) to the landowner. The Zandberg Sand Mine is well known in the surrounding community and to date no serious environmental or socio-economic impacts were identified to indicate/motivate the closure of the operation. The mine employs one local resident and contributes to the community as part of its SLP	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**
	obligations. The proposed extension (if approved) will contribute to the continued existence of the mine as an important sand supplier in the Robertson and greater Langeberg area.	
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area? 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	LA1 entails the mining of the ±27 ha area, within the proposed ±108 ha extension area, without impacting/influencing the status of the vegetation / ecosystem type, red data species or the conservation targets set out for the CBA1 area. Also refer to: ⋉ Part A(1)(g)(i) Details of the development footprint alternatives considered; ⋉ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Vegetation; ⋉ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	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 Heading 2(h)(iv)(1)(a) 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?	As mentioned earlier, the Zandberg Sand Mine has been operational for the past 26 years. The mine is a known supplier of sand in the Robertson community and contributes directly to society through the employment of a local resident as well as the Local Economic Development (LED) commitments of the mine (stipulated in the SLP). Indirectly, the mine contributes to infrastructure development in the surrounding area (sand supplier) and the spending of wages in the Robertson area.	
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The mine supplies sand to the building industry in the Robertson and greater Langeberg area. In addition, the mine has to meet the commitments of the SLP regarding Human Resources Development, Local Economic Development, and the process pertaining to management of downscaling and retrenchment. Through the past 26 years, the mine did not affect the physical, psychological, cultural or social needs of the community in a negative manner. Nor will the proposed extension of the mining footprint impact negatively on the socio-economic status of the area.	Highly Desirable
Will the development result in equitable impact distribution, in the short- and long-term?	The Zandberg Sand Mine has been operating in a socially and economically sustainable manner during both the short- and long term.	Highly Desirable
In terms of location, describe how the placement of the proposed development will contribute to the area.	The sand resource on the property has been mined since the 1980's, and as mentioned earlier, is a well-known sand supplier in the area. Should LA1 be approved, the option will allow the MR Holder to mine ±27 ha of the sand resource on the property, while ±81 ha of the proposed extension area will be formally protected as a biodiversity offset area that will be part of the mine's compliance responsibilities.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	No negative socio-economic impacts could, at this stage, be identified that cannot be managed through the implementation of mitigation measures.	Highly Desirable
How will the socio-economic impacts resulting from this development impact on people's environmental right?	As mentioned in Heading *3(j)(1) Impact on the socio-economic condition of any directly affected person*, the activity may have an impact on the visual characteristics of the surrounding environment, and may potentially affect air quality and possibly the noise ambiance of the study area. However, the mine is managed in accordance with the practices of the farm, and should LA1 be approved the potential visual-, dust-, and noise impacts associated with the proposed activity will be of very low significance. If the proposed mitigation measures and monitoring programs, as proposed in this document, is implemented, it is believed that no environmental rights of the surrounding residents/public will be affected by the socio-economic impacts associated with the proposed activity.	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 and how the development's socio-economic impacts will result in ecological impacts?	Sand mining commenced in the 1980's on the farm Zandberg fontein, and the revenue generated by the mine has since then contributed as an additional source of income (compensation) to the landowner. The Zandberg Sand Mine is well known in the surrounding community and to date no serious environmental or socio-economic impacts were identified to indicate/motivate the closure of the operation. The mine employs one local resident (excluding management) and contributes to the community as part of its SLP obligations. The proposed extension (if approved) will contribute to the continued existence of the mine as an important sand supplier in the Robertson and greater Langeberg area.	Highly Desirable
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	LA1 entails the mining of the ±27 ha area, within the proposed ±108 ha extension area, without impacting/influencing the status of the vegetation / ecosystem type, red data species or the conservation targets set out for the CBA1 area. Should the S102 application be approved, the extension of the mining area will prolong the lifespan of the Zandberg Sand Mine that will directly	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 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?	contribute to the socio-economic status of the receiving environment through the employment of a local resident, support of the local economy, and the implementation of the SLP commitments. Also refer to: ᔑ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	
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? 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?	The mine operates in accordance with, amongst others, the following: ᔑ CARA, 1983 – to ensure agriculture related compliance; ᔑ Financial Provision Regulations, 2015 – to ensure compliance in terms of rehabilitation; ᔑ Mine Health and Safety Act, 1996 (as amended) – to ensure employee safety; ᔑ MPRDA, 2002 (as amended) – to ensure mining related compliance; ᔑ NEM:AQA, 2004 – to ensure air quality related compliance; ᔑ NEM:BA, 2004 – to ensure biodiversity related compliance; ᔑ NEM:WA, 2008 – to ensure waste related compliance; ᔑ NEMA, 1998 (as amended) – to ensure environmental related compliance; ᔑ The land use zoning of the current mining footprint is also in line with the Land Use Planning Acts and Bylaws. Should the S102 amendment application be approved the extension area will also be subject to compliance with the above listed.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
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 supplies sand to the building industry in the Robertson and greater Langeberg area. In addition, the mine has to 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 operates in accordance with the specifications of the Mine Health and Safety Act, 1996. Site management holds daily discussions with the FEL operator 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.	Highly Desirable
Describe how the development will impact on job creation in terms of, amongst other aspects?	This application is for the extension of the existing mining area and no new job opportunities will be created. However, should the application be successful the job security of the current employee will be extended in accordance with the increased lifespan of the mine.	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	The Zandberg Sand Mine operates under a valid mining right issued by the DMRE. Compliance of the mine with the approval conditions is reported on as per the departmental specifications. Should the S102 amendment application be approved the extension area will also be managed in accordance with all the mining and environmental related legislations.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
resources will serve the public interest, and that 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 needed) by the mine. Should the mine continue with the strip mining method and progressive rehabilitation, the residual impact on the environment is of low significance.	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. The Zandberg Sand Mine has a bank guarantee lodged with the DMRE that is deemed sufficient to cover the financial provision amount needed to rehabilitate the mining footprint. Should the S102 amendment application be approved and the DMRE require a change to the current bank guarantee the document will be amended accordingly.	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	LA1 entails the mining of the ±27 ha area, within the proposed ±108 ha extension area, without impacting/influencing the status of the vegetation / ecosystem type, red data species or the conservation targets set out for the CBA1 area. Also refer to: ⋉ Part A(1)(g)(i) Details of the development footprint alternatives considered;	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
	⁎ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Socio-Economic Environment; ⁎ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	
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.	This application is for the extension of the current mining area. As mentioned earlier, should the S102 application be approved, the extension of the footprint will not cause a cumulative socio-economic impact as mining will gradually progress into the extension area, while the current mining method will persist.	Highly Desirable

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.

APPROVED ZANDBERG SAND MINE

Not applicable.

SECTION 102 APPLICATION

The environmental assessment considered two layout alternatives that would allow the extension of the existing Zandberg Sand Mine. The footprint of LA1 allows for the mining of ±27 ha of the proposed ±108 ha extension area, while LA2 will provide the MR Holder with ±99 ha from where sand could be mined. The following matters contributed to the identification of the preferred development footprint (LA1):

1. **Visual Characteristics –** The small scale of the proposed operation (±0.5 ha affected at a time), proposed progressive rehabilitation, as well as the fact that no infrastructure will be established assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine.

2. **Hydrology** – The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998. The MR Holder proposes to mine the sand resource up to the underlying sandstone layer that gradually inclines up the hill. The sandstone layer will be the limiting depth of the proposed mining activity. In order to avoid impacting on infiltration, groundwater recharge and flow, the Department of Water and Sanitation (DWS) generally stipulates that sand mining not be allowed within 1.5 m of the groundwater level. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from the proposed extension area will intercept (or come within 1.5 m) the groundwater layer.

3. **Biodiversity, Conservation, and Groundcover** – Should LA1 be approved, the loss of vegetation will according to the botanist not affect the conservation

targets, compromise the ecological functioning of the larger "natural" environment, or disrupt the connectivity of the landscape for fauna and flora or impair their ability to respond to environmental fluctuations. According to the BSA the northern section of the site (±27 ha – LA1) can be regarded as acceptable loss to the development as this area covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. The remaining southern area (±81 ha) will be set aside to function as a biodiversity offset area that will form part of the mine's compliance obligations.

4. **Cultural and Heritage Environment** – The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

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.

APPROVED ZANDBERG SAND MINE

Project/site alternatives does not apply to the current Zandberg Sand Mine. The mine's approved EMPR (2014) notes that no alternative has been looked at as this operation has been in existence since 1994.

S102 APPLICATION

Initially, the project team identified one site alternative with a possibility of various layout alternatives that had to be assessed during the EIA process. The following alternative options were assessed during the EIA process upon review of the site specific information, comments received during the public participation process, and the outcomes of the specialist studies.

Site Alternatives:

Site Alternative 1 (S1) (Preferred Site Alternative): Site Alternative 1 entails the extension of the current mining footprint (17.6826 ha) with 108.3851 ha over Portion 4 of the farm Zandberg fontein No 97, within the boundaries of the following GPS coordinates.

Table 7: GPS Coordinates of Site Alternative 1 (Preferred Site Alternative).

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
G	33º50'41.92"	19º48'54.92"	-33.844978º	19.815256º
H	33º50'49.92"	19º48'56.52"	-33.847200º	19.815700º
I	33º50'52.18"	19º48'45.17"	-33.847827º	19.812547º
J	33º50'44.16"	19º48'43.56"	-33.845601º	19.812100º
K	33º50'42.81"	19º48'50.44"	-33.845225º	19.814011º
L	33º50'37.25"	19º48'49.99"	-33.843681º	19.813886º
M	33º50'37.92"	19º48'37.05"	-33.843867º	19.810292º
N	33º50'51.13"	19º48'38.18"	-33.847536º	19.810606º
P	33º50'20.73"	19º48'34.09"	-33.839014º	19.809360º
Q	33º51'00.47"	19º47'51.75"	-33.850163º	19.797751º
R	33º51'15.84"	19º48'03.10"	-33.854400º	19.800862º

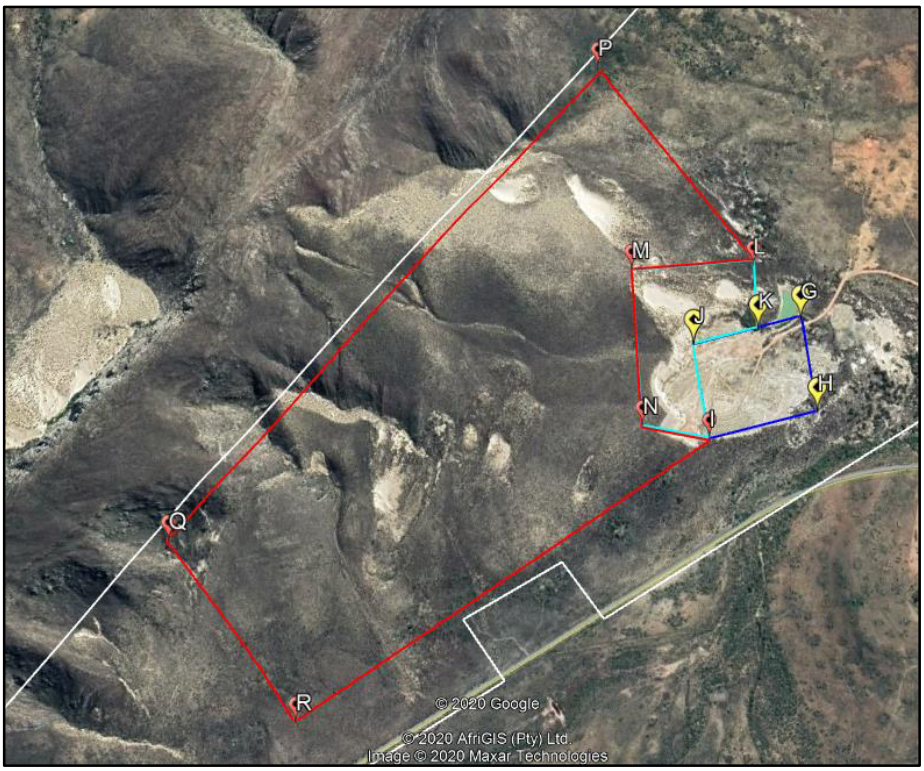


Figure 6: Satellite view showing the position of Site Alternative 1 within the surrounding landscape, where the blue polygons show the current mining footprint, the red polygon shows the proposed extension area and the white lines show the farm boundary. (Image obtained from Google Earth)

Site Alternative 1 was identified during the planning phase by the MR holder and project team, as the preferred site alternative based on the following:

- The proposed footprint offers the MR holder access to the sand deposit on the property.
- The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine.
- Access to the proposed mining area is possible from the existing farm road with a formal (existing) entrance onto the La Chasseur/Agter-Kliphoogte road.
- The proposed strip mining method and associated progressive rehabilitation of the area will minimise the visual impact of the activities on the receiving environment.

Other site alternatives were not deemed feasible as:

- the proposed extension area cannot be moved to the north, north-west or south due to the vicinity of the farm boundaries,

- moving the proposed footprint to the north-east or east will take it from the sand resource.

Layout Alternatives:

Layout Alternative 1 (LA1) (Preferred Layout Alternative): Layout Alternative 1 entails the mining of an approximate area of 27 ha within the proposed ±108 ha extension area, while the remaining area is protected as a no-go area (see figure below).

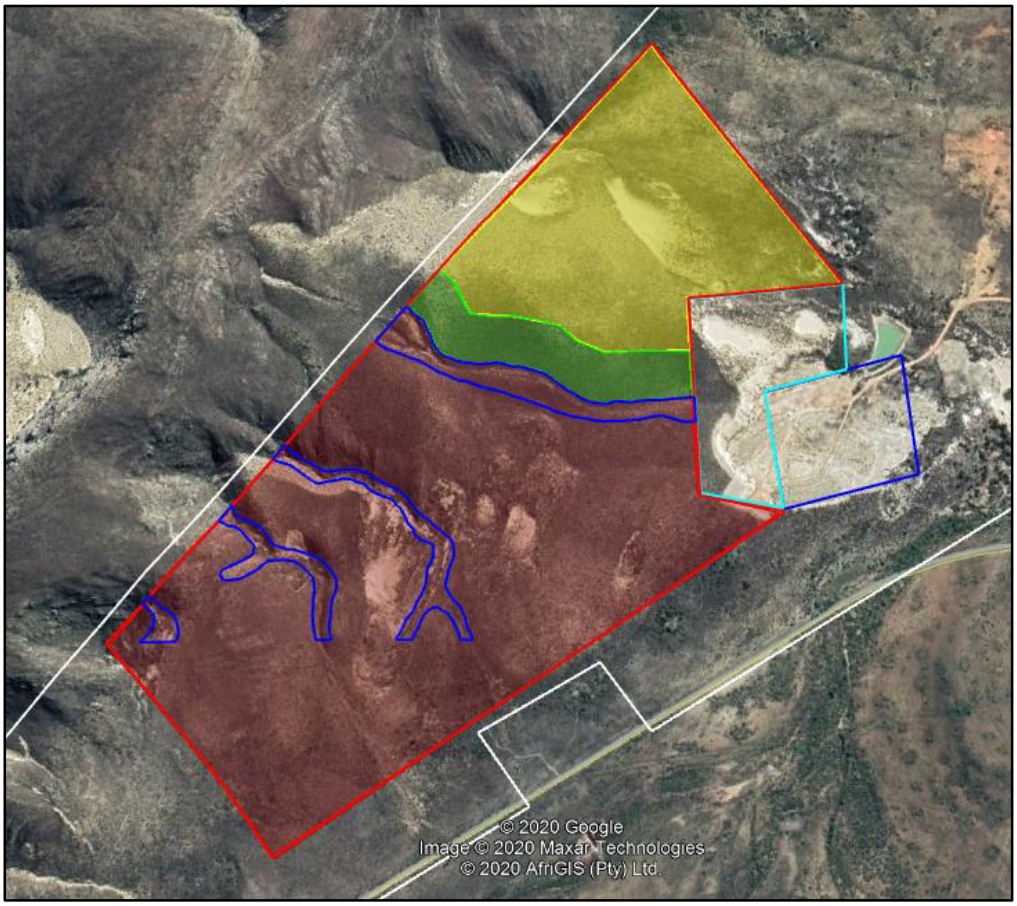


Figure 7: Map showing the proposed layout of Layout Alternative 1 where the yellow polygon shows the mineable area, green shaded area shows the 100 m buffer area, blue lines indicates the drainage lines, and the red shaded area shows the highly sensitive area to be protected as a no-go area. (Image obtained from Google Earth)

LA1 was derived upon review of the BSA findings as it will allow the MR Holder to extend the mining area while still protecting the most sensitive areas on the property. The following matters were considered regarding Layout Alternative 1.

Positive aspects associated with Layout Alternative 1 include:

- This option does allow the expansion of the mining area in a north/north-western direction;
- The proposed extension area is connected to the approved mining area, centralising mining to a specific portion of the farm and avoiding habitat fracturing. This layout will enable the MR Holder to gradually extend mining from the approved area into the proposed extension area;
- The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998;
- The BSA proposed/supports Layout Alternative 1, and deems the northern section an acceptable loss as this area covers a small portion of the dune plume with no exposed sandstone outcrops or drainage lines. The area is largely a uniform habitat type, and development within this section will not impact the status of the vegetation/ecosystem type, red data species or influence the conservation targets set out for the CBA1 area;
- The highly sensitive southern part of the extension area, as identified in the BSA, will be formally protected by the MR Holder as a biodiversity offset area that will form part of the mine's compliance obligations.
- This layout requires a smaller area to be rezoned from agricultural use to industrial use in terms of the municipal- and national spatial development legislation; and
- Although strip mining will be implemented, extending the mining area in a north/north-western direction will lessen the visual impact on the surrounding environment according to the viewshed analysis (refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on the site – Site Specific Visual Characteristics*).

Negative aspects associated with Layout Alternative 1 entails:

- The mineable area does extend over an area with Breede Sand Fynbos that is classified as a Vulnerable vegetation type, and will entail the gradual removal of ±27 ha of the established vegetation cover;
- This layout allows the MR Holder to mine only ±27 ha of the ±108 ha extension area; and

- The proposed mineable area (±27 ha) will temporarily be lost to the landowner for the duration of the mining operation. This area will however return to agricultural zoning upon closure.

However, should the mitigation measures and monitoring programs proposed in this document be implemented on site, Layout Alternative 1 is deemed the preferred option as this alternative will allow the extension of the mining area, while still protecting the most sensitive areas on the property.

Layout Alternative 2 (LA2): Layout Alternative 2 entails the mining of ±99 ha between the identified drainage lines within the proposed ±108 ha extension area (see figure below).

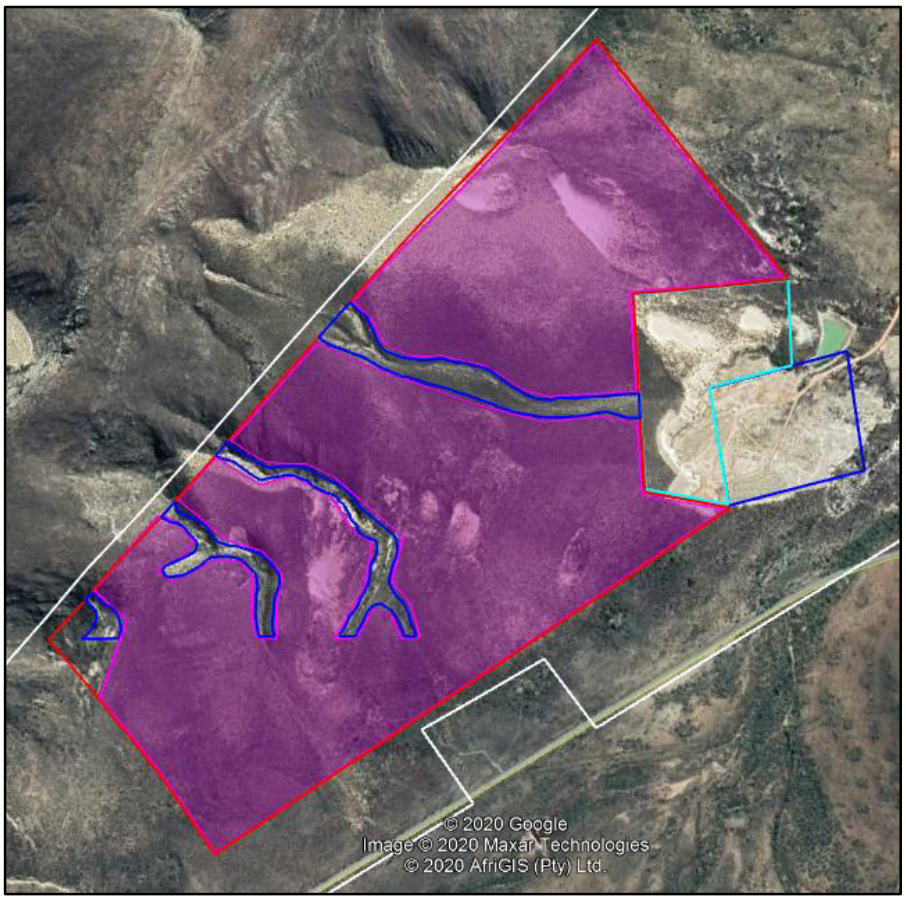


Figure 8: Map showing the proposed layout of Layout Alternative 2 where the pink shaded polygon shows the mineable area, while the blue lines indicates the drainage lines. (Image obtained from Google Earth)

LA2 was considered during the EIA process, as it will allow the MR Holder with a larger mineable area than LA1. The following matters were considered regarding Layout Alternative 2:

Positive aspects associated with Layout Alternative 2 include:

- This layout will provide the MR Holder with a mineable area of ±99 ha compared to the ±27 ha of LA1, and therefore the expected life of mine will be considerably more; and
- As with LA1, the proposed extension area is connected to the approved mining footprint and mining can gradually extend into this area.

Negative aspects associated with Layout Alternative 2 entails:

- This layout requires a water use application to be submitted to the DWS in terms of the NWA, 1998 as mining is proposed within 100 m of the identified drainage lines;
- The BSA does not support LA2, as it will entail the removal of established Breede Sand Fynbos and North Sonderend Sandstone Fynbos to allow access to the mineral from especially the highly sensitive southern part of the proposed extension area. This layout will influence the conservation targets of the CBA1.
- Should mining extend into the southern part of the extension area, the MR Holder will have to implement search and rescue inspections prior to the mining of each consecutive strip to identify/confirm the presence of red data/protected plant species. Removal/destruction permits will then be needed for the identified species prior to the mining of the area.
- This layout requires the entire ±108 ha extension area to be rezoned from agricultural use to industrial use in terms of the municipal- and national spatial development legislation;
- Although strip mining will be implemented, extending the mining area over a ±99 ha area will have a higher visual impact on the surrounding environment; and
- The proposed mineable area (±99 ha) will temporarily be lost to the landowner for the duration of the mining operation.

In light of the above, and the review of the potential impacts associated with LA2, layout alternative 2 is not deemed the preferred option as this alternative has a much higher ecological significance without the need or motivation justifying it.

No-go Alternative:

The **no-go alternative** entails no change to the *status quo* and is therefore a real alternative to be considered. 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 exploit the remaining sand resource on the property, resulting in a loss of potential income. The life of mine of Zandberg Sandput (Pty) Ltd will depend on the availability of sand in the approved mining area.
- The landowner will not receive compensation for the use of the earmarked footprint on the property.
- The vegetation cover surrounding the approved mining area will not be disturbed by mining and should remain intact (bar other disturbance).
- Formal protection of the southern part of the extension area, as a biodiversity offset area, will not be possible.

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).

S102 APPLICATION

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents that were sent directly to the contact persons. A 30 days commenting period was allowed that expired 02 March 2020. The following table provides a list of the I&AP's and stakeholders that were informed of the project:

Table 8: List of the landowners, I&AP's and stakeholders that were supplied with a copy of the background information document.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: • Zandbergfontein Trust Portion 4 of Zandberg Fontein 97 **Surrounding Landowners and I&AP's:** • Lamaison Goree Trust Portion 0 of Zand Berg 101	• Breede-Gouritz Catchment Management Agency; • Cape Winelands District Municipality; • CapeNature; • Department of Agriculture, Forestry and Fisheries; • Department of Economic Development and Tourism; • Department of Environmental Affairs and Development Planning; • Department of Labour;

⁎ P du Toit Portion 0 of Zandbult 98 ⁎ Deorista 113 (Pty) Ltd Portion 0 of Die Gwarries 93 & RE of Laughing Waters 96 ⁎ Shalk Colyn Trust Portion 2 (RE) of Klip Berg 136 ⁎ Mazi (Pty) Ltd RE of Farm 194 ⁎ AN Viljoen Portion 2 (RE) of Appels Drift 107 & Portion 0 of Farm 109 ⁎ Deo Volente Sand-mine (I&AP)	⁎ Department of Rural Development and Land Reform – Western Cape District Offices; ⁎ Department of Social Development; ⁎ Department of Transport and Public Works; ⁎ Department of Water and Sanitation; ⁎ Eskom; ⁎ Heritage Western Cape; ⁎ Langeberg LM: Ward 5 Councillor; ⁎ Langeberg Local Municipality; ⁎ South African Heritage Resources Agency.
I&AP'S AND STAKEHOLDERS THAT REGISTERED / COMMENTED DURING THE INITIAL NOTIFICATION PERIOD	
⁎ Breede-Gouritz Catchment Management Agency; ⁎ CapeNature; ⁎ Department of Environmental Affairs and Development Planning (DEA&DP); ⁎ Department of Transport and Public Works (DTPW); ⁎ Heritage Western Cape (HWC); ⁎ Langeberg Local Municipality (LLM); ⁎ D Satchel (Deo Volente Sand-mine).	

An advertisement was placed in the Breederivier Gazette on 28 January 2020 and on-site notices were placed on 25 January 2020 at the entrance to the farm and the Agri Express Mark in Robertson. The advertisement, background information document (BID) and on-site notices invited the recipients to register/comment on the project on/before 02 March 2020.

In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) the Draft Scoping Report (DSR) was compiled to allow perusal of the report by the I&AP's and stakeholders listed above. A 30-day commenting period, ending 17 July 2020, was allowed for perusal of the documentation and submission of comments. The following table provides a list of the I&AP's and stakeholders that were informed of the availability of the DSR:

Table 9: List of the landowners, I&AP's and stakeholders that were invited to comment on the DSR.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: ⁎ Zandbergfontein Trust Portion 4 of Zandberg Fontein 97 **Surrounding Landowners and I&AP's:** ⁎ Lamaison Goree Trust	⁎ Breede-Gouritz Catchment Management Agency; ⁎ Cape Winelands District Municipality; ⁎ CapeNature; ⁎ Department of Agriculture, Forestry and Fisheries; ⁎ Department of Economic Development and Tourism; ⁎ Department of Environmental Affairs and Development Planning;

Portion 0 of Zand Berg 101 ᵡ P du Toit Portion 0 of Zandbult 98 ᵡ Deorista 113 (Pty) Ltd Portion 0 of Die Gwarries 93 & RE of Laughing Waters 96 ᵡ Shalk Colyn Trust Portion 2 (RE) of Klip Berg 136 ᵡ Mazi (Pty) Ltd RE of Farm 194 ᵡ AN Viljoen Portion 2 (RE) of Appels Drift 107 & Portion 0 of Farm 109 ᵡ Deo Volente Sand-mine (I&AP)	ᵡ Department of Labour; ᵡ Department of Rural Development and Land Reform – Western Cape District Offices; ᵡ Department of Social Development; ᵡ Department of Transport and Public Works; ᵡ Eskom; ᵡ Heritage Western Cape; ᵡ Langeberg LM: Ward 5 Councillor; ᵡ Langeberg Local Municipality; ᵡ South African Heritage Resources Agency.
I&AP'S AND STAKEHOLDERS THAT COMMENTED ON THE DSR	
ᵡ Department of Environmental Affairs and Development Planning (DEA&DP); ᵡ Department of Transport and Public Works (DTPW); and ᵡ Langeberg Local Municipality (LLM).	

The comments and responses received on the DSR were incorporated into the Final Scoping Report that was submitted to DMRE on 29 July 2020 for decision making. DMRE accepted the FSR on 02 October 2020.

Upon approval of the Final Scoping Report, this report the Draft Environmental Impact Assessment Report was compiled that will be circulated for public comment for a 30-day commenting period ending on 30 November 2020. The comments received on the draft EIA & EMPR will be incorporated into the final EIA & EMPR to be submitted for decision making to DMRE.

See attached as Appendix H 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 10: 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 4 of Zandberg fontein 97 ⋉ Zandbergfontein Trust	**X**	-	The landowner is aware of, and supports, the application. See attached as Appendix F3 proof of the signed landowner consent.		
Lawful occupiers/s of the land	No lawful occupiers, other than the landowner, has access to the property.				
N/A	**-**	**-**	**-**	**-**	**-**
Landowners or lawful occupiers on adjacent properties	**X**	**-**	**-**	**-**	**-**
Lamaison Goree Trust ⋉ Portion 0 of Zand Berg 101	**X**	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Mr P du Toit (trustee of Lamaison Goree Trust) ⋉ Portion 0 of Zandbult 98	**X**	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		

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**
Deorista 113 (Pty) Ltd (Mr J Rabie) ⁎ Remaining Extent of Laughing Waters 96 ⁎ Portion 0 of Die Gwarries 93	**X**	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Shalk Colyn Trust (Mr S Colyn) ⁎ Portion 2 (Remaining Extent) of Klip Berg 136	**X**	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Mazi (Pty) Ltd (Me A Lambrecht) ⁎ Remaining Extent of Farm 194	**X**	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Mr AN Viljoen (trustee of Lamaison Goree Trust) ⁎ Portion 2 (Remaining Extent) of Appels Drift 107 ⁎ Portion 0 of Farm 109	**X**	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Municipal councillor Ward 5	**X**	-	Any comments received from the municipal councillor (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Municipality Langeberg Local Municipality (LLM)	**X**	28 January 2020	Me T Brunings commented on behalf of the LLM as follows.	Greenmined responded as listed below on 30 January 2020.	See list below.

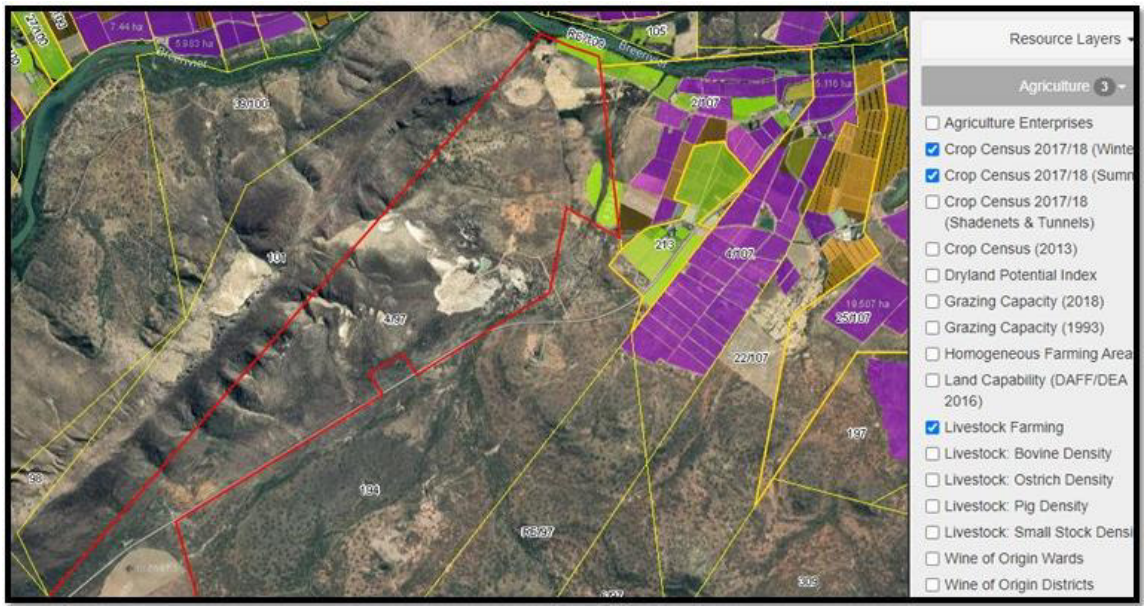
Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Comments received from Langeberg Local Municipality: The municipality awaits the Application Scoping Report, and requested additional information regarding botanical environmental assessment and the visual impact. The municipality is concerned about: - the scale, and need and desirability of the extension application, - the area is not used for agricultural purposes but is pristine natural vegetation, - natural vegetation should be re-established if the area is permitted to be mined.				
Response to the comments received from the LLM: "Greenmined Environmental herewith thank you for your interest in the project, and acknowledge receipt of your correspondence received 28 January 2020 regarding the proposed Section 102 amendment application to be submitted on behalf of Zandberg Sandput (Pty) Ltd. We registered the Langeberg Municipality as a stakeholder on the project, and will henceforth keep you posted on the progress of the Environmental Impact Assessment process as well as supply you with a copy of the draft scoping report (DSR) for your perusal. We take note of your concerns as listed in the attached BID. We will include your correspondence in the DSR and assess it as part of the Draft Environmental Impact Assessment Report that will also be available for your perusal. In the interim, please note that although the proposed extension extends over ±108 ha, it is proposed that the current 1 ha strip-mining method continues should the application be approved. In light of this the mined out area (1 ha) will be rehabilitated prior to the mining of a consecutive strip (1 ha). The botanist was tasked to identify sensitive areas where mining should not be allowed. The findings of the specialist will be incorporated into the DEIAR to be distributed for perusal and commenting. We trust you find this in order. Please do not hesitate to contact me in the event of any uncertainties."				
- Part A(1)(d)(ii) Description of the activities to be undertaken – 2. S102 Application. - Part A(1)(f) Need and desirability of the proposed activities. - Part A(1)(g)(iv) The environmental attributes associated with the development footprint alternatives. - Appendix M – Closure Plan.				

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 received from the LLM on the DSR (13 July 2020): "…. The following statistics must be provided with regard to the proposed large scale expansion: • How much of the currently approved 17,65 ha has already been mined? • How many hectares are still available to be mined? • How many years will it take to mine this remaining approved mine area? • Why is such large extension (108,3851ha.) being applied for? (If 17,68ha. was sufficient for sand mining for a 30+yr period, it would seem unnecessary to apply for more than a ±20ha expansion at this stage). The scoping report still refers to the land as being used for agriculture and returning the use after mining to agricultural (pp 19, 38, 63, 71, 75, 81, 82, 87, 90, 97). This is clearly a cut and paste error from another application, and must be corrected throughout the document. Pg 58 summarises the conservation status of the natural vegetation which covers the entire site, and it is clear that there is no agricultural activity on this land and that should mining be permitted, natural vegetation should be re-established in terms of the rehabilitation process, not agricultural crops."				
Response to the DSR comments received from the LLM (14 July 2020): "…. We take note of your request for additional information, and will incorporate and discuss the request in the draft Environmental Impact Assessment Report (DEIAR) to be circulated for public comments upon approval of the final Scoping Report. Regarding your comment about the agricultural use of the property: There was no copy and paste error. The land earmarked for the proposed expansion is currently zoned for agricultural purposes. The Department of Environmental Affairs and Development Planning confirmed on 09 March 2020 that: "*Agricultural Land is defined in the Regulations as being land outside the physical outer edge of the existing urban edge. Whether the land has been cultivated or irrigated in the preceding 10 years is irrelevant in respect of this category of land development*". In light of this, the land use description of the earmarked area cannot be anything other than agriculture even though the footprint is presently covered with natural vegetation. Upon closure of the mine, the use of the mining footprint will be returned to the landowner to allow him to continue farming the property (whether through grazing of natural vegetation or active cultivation). We take note of your suggestion that natural vegetation should be established on the rehabilitated areas. Your request will be forwarded to the botanist responsible for the Botanical Impact Assessment and his suggestions will be incorporated into the Rehabilitation and Closure Plan that will form part of the DEIAR."				

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

Further comments received from the LLM (14 July 2020):

"…I stand by my comments regarding the land use of the property and wish the following noted: The scoping report refers to the land as being used for agricultural purposes and returning the use after mining to agricultural (pp 19, 38, 63, 71, 75, 81, 82, 87, 90, 97). This is misleading to those who read the report as there is no conventional agricultural activity on the portion of land where the mine expansion is proposed, as is clear from the extract below from Cape Farm Mapper, and from a site visit. Whilst the land is zoned Agricultural zone I, and despite the legal definitions of "Agricultural land", the current use of this land is vacant, natural vegetation. Pg 58 of the scoping report summarises the vulnerable conservation status of much of the natural vegetation which covers the site. Accordingly, should mining be permitted, natural vegetation should be re-established in terms of the rehabilitation process. Alternatively, if agricultural crops are proposed to be established, this must be addressed in the EIA in terms of the proposed extent and nature of crops, to enable the relevant Departments to comment meaningfully.



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
Greenmined acknowledged response (14 July 2020) of the comments and confirmed that it will be incorporated into the final Scoping Report and the draft EIAR.				
Me Brunings requested a copy of the FSR section with comments from IAP's on 28 July 2020. Greenmined supplied Me Brunings with a copy of the Comments and Response Report that was attached to the FSR on 29 July 2020.				
Additional response to the comments received from the LLM on the DSR (13 July 2020): ⁜ *How much of the currently approved 17,65 ha has already been mined?* • Approximately 9 ha of the approved mining area has been mined. • Refer to Part A(1)(g)(iv)(a) Type of environment affected by the proposed activity – Visual Characteristics. ⁜ *How many hectares are still available to be mined?* • Approximately 8.6 ha of the approved area is still available to be mined. ⁜ *How many years will it take to mine this remaining approved mine area?* • The MR holder mines approximately 0.5 ha per year depending on market demand and sales. In this circumstance, it should take ±17 years to mine the remaining approved area. • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Operational Phase. ⁜ *Why is such large extension (108,3851ha.) being applied for? (If 17,68ha. was sufficient for sand mining for a 30+yr period, it would seem unnecessary to apply for more than a ±20ha expansion at this stage).* • Refer to Part A(1)(f) Need and desirability of the proposed activities – Section 102 Amendment Application; • Part A(1)(g)(i) Details of the development footprint alternatives considered – S102 Application; • Part A(1)(g)(x) Statement motivating the alternative development location within the overall site – S102 Application; and • Part A(1)(k)(i) Summary of the key findings of the environmental impact assessment. ⁜ …. natural vegetation should be re-established in terms of the rehabilitation process, not agricultural crops • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – *2.4 Decommissioning Phase;* • Appendix I1 – Botany Study and Assessment, 2020;				

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
• Appendix M – Closure Plan.					
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA, etc	**X**	**-**	**-**	**-**	**-**
Department of Transport and Public Works (DTPW)	**X**	30 January 2020	Mr Lyle Martin confirmed receipt of the BID and informed that the matter is receiving attention and that a further communication will be addressed to us (Greenmined) as soon as circumstances permit.	The comments received from DTPW were incorporated into the DSR. The proposed extension area will make use of access off Divisional Road 1342 (La Chasseur/Agter-Kliphoogte road) as mentioned in the DTPW comments (below).	Appendix H – Proof of Public Participation
		11 March 2020	Ms GD Swanepoel submitted the following comments on the project through regular mail that was received 11 March 2020 although the comments are dated 19 February 2020.		See list below.
Summary of the comments received from DTPW: In this Branch's (*DTPW*) comment on the land use application, it stipulated the following conditions: ⋉ The necessary right of way servitude be registered prior to the commencement of mining and, ⋉ The access off Divisional Road 1342 at ± km 4.93 be constructed as a Main Farm Access as per the attached standard (see Appendix 5) and provided with a sealed hard-surface. Provided the same access will be used as detailed in the above paragraph this branch offers no objection to the application.					
⋉ Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.2 Existing Infrastructure. ⋉ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Existing infrastructure.					

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 DTPW on the DSR (13 July 2020): "…A fleeting look at the Scoping Report shows that the comment from our letter dated 19 February 2020 has been recorded and noted. The Branch has no further comment at this stage."					
Comments submitted by the DTPW on the FSR (26 August 2020): "…The branch has no additional comment on the Final Scoping Report. Our letter dated 19 February 2020 is still applicable."					
Department of Water and Sanitation (DWS)	**X**	28 & 29 January 2020	Me Nelisa Ndobeni and Me Melissa Lintnaar-Strauss responded that the Breede-Gouritz Catchment Management Agency (BGCMA) must be informed of the proposed project.	The BGCMA was informed of the proposed project.	Appendix H – Proof of Public Participation
Eskom Ltd	**X**	-	Any comments received from Eskom (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Communities	N/A	No communities border the mining area or were identified within 100 m from the site.			
Dep. Land Affairs	N/A	Not applicable as this is an application for a Section 102 amendment of the approved mining right on the same property.			
Traditional Leaders	N/A	No tradition leaders borders the mining area or were identified within 100 m from the site.			
Dept. Environmental Affairs (DEA&DP)	**X**	28 January 2020	Me A La Meyer acknowledged receipt of the BID and registered the DEA&DP as commenting authority.	The DEA&DP was registered as commenting authority on the project and will be supplied with copies of all the public documents.	Appendix H – Proof of Public Participation

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
		20 July 2020	Mr Gerhard Gerber submitted the below listed comments on the DSR.	Greenmined acknowledged (21 July 2020) receipt of the comments on the draft Scoping Report and confirmed that the comments will be incorporated into the final Scoping Report (FSR), and (upon approval of the FSR) addressed in the draft Environmental Impact Assessment Report that will be published for public commenting. See below for additional response to the comments.	Refer to below listed sections.

Comments received from the DEA&DP on the DSR (20 July 2020):

"1. Directorate: Development Management (Region 1) – Ms Ayesha Hamdulay:

1.1. It is noted that several non-perennial drainage lines traverse the proposed mining right expansion area. Activity 19 of Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) has however not been applied for.

1.2. It is further noted that haul roads may be required. Please be advised that should new roads wider that 4m be established in areas containing indigenous vegetation, Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) will be applicable.

1.3. The applicability of Activity 19 of Listing Notice 1 and Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) must be confirmed in the Final Scoping Report ("FSR") to be submitted to the competent authority. Should the mentioned listed activities be applicable to the proposed mine expansion, an amended application form must be submitted to the competent authority and the impacts associated with the listed activities must be assessed and reported on in the Draft EIA Report.

1.4. Following the above, not all the impacts associated with the proposed mine expansion have been identified in the DSR for further assessment in the environmental impact reporting ("EIR") phase. Per paragraph 1.1. above, drainage lines traverse the proposed mine expansion area; however, the impacts on watercourses have not been identified in the DSR for further assessment in the EIA phase. (In this regard, also refer to paragraph 2.1. below.)

1.5. Furthermore, page 53 of the DSR states that "*It is known that the water table in the valley below the mine is ±3 m under the surface.*" The depth of mining and whether the proposed sand mining activities will have an impact on groundwater resources, were not indicated in the DSR. This information must be provided in the Draft EIA Report.

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
1.6. Per the DSR, the proposed mine expansion area falls within a Critical Biodiversity Area ("CBA"). Please be advised that this Directorate does not support mining within a CBA. The description of alternatives does not clearly illustrate how the mitigation hierarchy was considered when selecting the preferred (and only) site and layout alternatives. Alternatives that avoid CBAs must be further investigated and reported on in the Draft EIA Report. 1.7. It is noted that the Provincial Department of Agriculture ("DoA") has not been included in the list of state Departments to be consulted as part of the EIA process. Please ensure that said Department is consulted for comment. Depending on the comments obtained from the Provincial DoA, an agricultural impact assessment be required. 1.8. The Plan of Study for EIA must be updated to include all the impacts that will be assessed and all the specialist studies that will be undertaken during the EIR phase. 1.9. In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for environmental in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint additional specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be undertaken, the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken. 1.10. The EAP is advised to consider the "*Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation*" ("the protocols"), promulgated in GN No. 320 of 20 March 2020, which came into effect on 9 May 2020. If evidence can be provided to the Competent Authority to show that a specialist study for which a protocol has been prescribed was initiated prior to 9 May 2020, then the protocol in question does not have to be complied with. For those specialist studies where no specific protocol has been prescribed, the level of assessment must comply with the requirements of Appendix 6 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations, 2014 (as amended). The Final Scoping Report submitted to the Competent Authority, as well as the draft EIA Report once released for comment, must be clear which protocols apply and which do not. 2. Directorate: Pollution and Chemicals Management – Ms Shehaam Brinkhuis: 2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment. 2.2. Site-specific hydrology and geohydrology has been detailed on pages 66 to 68 of the DSR. The description provided, extracted from previously compiled reports, clearly indicates that the proposed mining expansion area and the establishment of mining activities across a substantial area shall have a significant impact on groundwater resources. Thus, it is recommended that input be obtained				

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

from a suitably qualified and experienced geohydrologist to inform the EIR phase. Per paragraph 2.1. above, the Plan of Study for the EIA should be amended to include a Geohydrological Impact Assessment.

2.3. Further to paragraphs 2.1. and 2.2. above, it is noted that the potential impacts of the proposed mine expansion on water resources and freshwater features have not been adequately identified and described during the scoping phase. Sufficient consideration should be given to these potential impacts in the Draft EIA Report.

2.4. Storm-water runoff must be controlled to ensure that on-site activities do not culminate in off-site pollution, erosion or sedimentation. It is recommended that the EIR phase make provision for the inclusion of a storm water management plan. Such a storm water management plan should also describe the proposed methods to prevent contaminated or polluted storm water from being released into the receiving environment, with attention paid to potentially sensitive areas yet to be identified by specialists during investigation of the proposed mine expansion area.

2.5. Although acknowledged that the proposed mining method may limit the pollution potential (as stated on page 27 of the DSR), it is noted that pollution and contamination may still occur and it is recommended that potential pollution impacts due to mining activities, are more thoroughly considered. It is essential that identified pollution impacts are adequately addressed and management measures must be proposed in the Environmental Management Programme ("EMPr") to be submitted with the EIA Report.

3. Directorate: Waste Management – Mr Lance Anders:

3.1. Table 1, page 14 of the DSR indicates the applicable listing notices and listed activities, without providing an explanation of the listed activities. Please discuss or write out each applicable listed activity for better understanding by interested and affected parties of the listed activities.

3.2. Page 20 of the DSR indicates that alternative dust suppression methods will be utilised, however these methods were not indicated. Since the Western Cape is a water scarce province, the applicant must ensure that only non-potable water is used for dust suppression. Dust suppression measures must be detailed in the EMPr.

3.3. Waste management impacts, including *inter alia*, the storage, handling, transport and disposal of all waste types, must be addressed in the EMPr.

4. Directorate: Air Quality Management – Ms Gavaza Mhlarhi / Mr Peter Harmse:

4.1 This Directorate awaits the Draft EIA Report and EMPr to provide comment. Please ensure that the EMPr provide management measures for dust and noise impacts associated with the proposed mining operations."

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
Greenmined acknowledged (21 July 2020) receipt of the comments on the draft Scoping Report and confirmed that the comments will be incorporated into the final Scoping Report (FSR), and (upon approval of the FSR) addressed in the draft Environmental Impact Assessment Report that will be published for public commenting. In addition to the above, the following comments were elaborated on in the FSR: 1.1. It is noted that several non-perennial drainage lines traverse the proposed mining right expansion area. Activity 19 of Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) has however not been applied for. *As mentioned earlier, the layout of the allowable mining areas, within the footprint of the proposed extension area, will be assessed during the EIA phase upon receipt of the specialist findings. Presently, it is proposed that buffer no-go areas will be demarcated around the drainage lines and no infilling, depositing, dredging, excavation, removal or moving of soil from a drainage line is envisioned. Therefore, the proposed project does not trigger Activity 19 of Listing Notice 1. However, as mentioned in the Plan of Study for the EIA Process the applicability of the listed activities will be confirmed and if needed aligned with the project proposal once the preferred alternative was finalised.* 1.2. It is further noted that haul roads may be required. Please be advised that should new roads wider that 4m be established in areas containing indigenous vegetation, Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) will be applicable. *The comment is noted, however, presently no roads wider than 4 m are proposed.* 1.3. The applicability of Activity 19 of Listing Notice 1 and Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) must be confirmed in the Final Scoping Report ("FSR") to be submitted to the competent authority. Should the mentioned listed activities be applicable to the proposed mine expansion, an amended application form must be submitted to the competent authority and the impacts associated with the listed activities must be assessed and reported on in the Draft EIA Report. *Presently, neither Activity 19 of Listing Notice 1 nor Activity 4 of Listing Notice 3 is deemed applicable to this application.* 1.4. Following the above, not all the impacts associated with the proposed mine expansion have been identified in the DSR for further assessment in the environmental impact reporting ("EIR") phase. Per paragraph 1.1. above, drainage lines traverse the proposed mine expansion area; however, the impacts on watercourses have not been identified in the DSR for further assessment in the EIA phase. (In this regard, also refer to paragraph 2.1. below.) *This impact was added to the Scoping Report and will be further assessed in the EIA phase.*				

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
1.5. Furthermore, page 53 of the DSR states that "*It is known that the water table in the valley below the mine is ±3 m under the surface.*" The depth of mining and whether the proposed sand mining activities will have an impact on groundwater resources, were not indicated in the DSR. This information must be provided in the Draft EIA Report. *The approximate depth of mining and potential impact on groundwater resources will be discussed in the Draft EIA Report.* 1.7. It is noted that the Provincial Department of Agriculture ("DoA") has not been included in the list of state Departments to be consulted as part of the EIA process. Please ensure that said Department is consulted for comment. Depending on the comments obtained from the Provincial DoA, an agricultural impact assessment be required. *The Department of Agriculture (DoA) were supplied with a copy of the background information document as well as invited to comment on the draft Scoping Report (refer to Appendix 5 for proof thereof). To date no feedback/comments was received from the DoA.* 1.8. The Plan of Study for EIA must be updated to include all the impacts that will be assessed and all the specialist studies that will be undertaken during the EIR phase. *This request was incorporated into this document, the Final Scoping Report.* 1.9. In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for environmental in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint additional specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be undertaken, the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken. *The abovementioned report generated from the National Web Based Environmental Screening Tool ("Screening Tool") was submitted to the competent authority with the EA Application form. The report was accompanied by a cover letter discussing the specialist studies deemed applicable to this application. However, this information was also added to the final Scoping Report under Section 3(c) Description of aspects to be assessed by specialist.* 1.10. The EAP is advised to consider the "*Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation*" ("the protocols"), promulgated in GN No. 320 of 20 March 2020, which came into effect on 9 May 2020. If evidence can be provided to the Competent Authority to show that a specialist study for which a protocol has been prescribed was initiated prior to 9 May 2020, then the protocol in question does not have to be complied with. For those specialist studies where no specific protocol has been prescribed, the level of assessment must comply with the requirements of Appendix 6 of the National				

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

Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations, 2014 (as amended). The Final Scoping Report submitted to the Competent Authority, as well as the draft EIA Report once released for comment, must be clear which protocols apply and which do not.

The botanical study as well as the archaeological- and palaeontological impact assessments were initiated in April 2020 and will therefore be in accordance with the requirements of Appendix 6 of NEMA EIA Regulations 2014 (as amended). Should any further specialist studies be required for which a protocol has been prescribed then the protocol in question will be complied with.

2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.

As mentioned earlier, the layout of the allowable mining areas, within the footprint of the proposed extension area, will be assessed during the EIA phase upon receipt of the specialist findings. Presently, it is proposed that buffer no-go areas will be demarcated around the drainage lines and no mining of the drainage lines are envisioned. Should the drainage lines be excluded from the mining footprint the potential impact of the proposed activity on watercourse is deemed to be of low significance, and in our opinion a Freshwater Impact Assessment is not applicable.

2.2. Site-specific hydrology and geohydrology has been detailed on pages 66 to 68 of the DSR. The description provided, extracted from previously compiled reports, clearly indicates that the proposed mining expansion area and the establishment of mining activities across a substantial area shall have a significant impact on groundwater resources. Thus, it is recommended that input be obtained from a suitably qualified and experienced geohydrologist to inform the EIR phase. Per paragraph 2.1. above, the Plan of Study for the EIA should be amended to include a Geohydrological Impact Assessment.

The approximate depth of mining and potential impact on groundwater resources will be discussed in the Draft EIA Report, and if deemed applicable the opinion of a groundwater specialist will be obtained and added to the DEIAR.

2.3. Further to paragraphs 2.1. and 2.2. above, it is noted that the potential impacts of the proposed mine expansion on water resources and freshwater features have not been adequately identified and described during the scoping phase. Sufficient consideration should be given to these potential impacts in the Draft EIA Report.

This impact was added to the Scoping Report and will be further assessed in the EIA phase.

2.4. Storm-water runoff must be controlled to ensure that on-site activities do not culminate in off-site pollution, erosion or sedimentation. It is recommended that the EIR phase make provision for the inclusion of a storm water management plan. Such a storm water management plan should also describe the proposed methods to prevent contaminated or polluted storm water from being released into the receiving environment, with attention paid to potentially sensitive areas yet to be identified by specialists during investigation of the proposed mine expansion area.

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

The requested storm water management plan will be incorporated into the DEIAR.

2.5. Although acknowledged that the proposed mining method may limit the pollution potential (as stated on page 27 of the DSR), it is noted that pollution and contamination may still occur and it is recommended that potential pollution impacts due to mining activities, are more thoroughly considered. It is essential that identified pollution impacts are adequately addressed and management measures must be proposed in the Environmental Management Programme ("EMPr") to be submitted with the EIA Report.

The potential pollution impacts will be further discussed and assessed in the DEIAR, and management measures will be proposed in the EMPR to be submitted with the DEIAR.

3.1. Table 1, page 14 of the DSR indicates the applicable listing notices and listed activities, without providing an explanation of the listed activities. Please discuss or write out each applicable listed activity for better understanding by interested and affected parties of the listed activities.

A full description of the listed activities was added to this report.

3.2. Page 20 of the DSR indicates that alternative dust suppression methods will be utilised; however, these methods were not indicated. Since the Western Cape is a water scarce province, the applicant must ensure that only non-potable water is used for dust suppression. Dust suppression measures must be detailed in the EMPr.

The following alternative dust suppression measures were proposed on page 20 of the DSR:

- *The speed of all mining equipment/vehicles will be restrictions to 20 km/h on the internal farm roads/haul roads to minimize dust generation;*
- *The removal of vegetation will only be done immediately prior to the mining of an area in an attempt to lessen denuded areas (acting as dust source) to the absolute minimum.*

The requirement that only non-potable water may be used for dust suppression was added to the FSR and will also form part of the DEIAR.

3.3. Waste management impacts, including *inter alia*, the storage, handling, transport and disposal of all waste types, must be addressed in the EMPr.

The requested information will be incorporated in the EMPR that will accompany the DEIAR.

Additional response to the comments received from the DEA&DP on the DSR (20 July 2020):

- *1.1 It is noted that several non-perennial drainage lines traverse the proposed mining right expansion area. Activity 19 of Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) has however not been applied for.*

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
⁜ *2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.* • Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered – S102 Application – Layout Alternatives. ⁜ *1.4. Following the above, not all the impacts associated with the proposed mine expansion have been identified in the DSR for further assessment in the environmental impact reporting ("EIR") phase. Per paragraph 1.1. above, drainage lines traverse the proposed mine expansion area; however, the impacts on watercourses have not been identified in the DSR for further assessment in the EIA phase. (In this regard, also refer to paragraph 2.1. below.)* ⁜ *2.3. Further to paragraphs 2.1. and 2.2. above, it is noted that the potential impacts of the proposed mine expansion on water resources and freshwater features have not been adequately identified and described during the scoping phase. Sufficient consideration should be given to these potential impacts in the Draft EIA Report.* • Refer to Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts; • Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk; • 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. ⁜ *1.5. Furthermore, page 53 of the DSR states that "It is known that the water table in the valley below the mine is ±3 m under the surface." The depth of mining and whether the proposed sand mining activities will have an impact on groundwater resources, were not indicated in the DSR. This information must be provided in the Draft EIA Report.* • Refer to Part A(1)(g)(iv)(1)(a) Type of environment to be affected by the proposed activity – Hydrology and Geohydrology; and • Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology and Geohydrology. ⁜ *1.6 Per the DSR, the proposed mine expansion area falls within a Critical Biodiversity Area ("CBA"). Please be advised that this Directorate does not support mining within a CBA. The description of alternatives does not clearly illustrate how the mitigation hierarchy was considered when selecting the preferred (and only) site and layout alternatives. Alternatives that avoid CBAs must be further investigated and reported on in the Draft EIA Report.* • Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered – S102 Application; • Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Mining and Biodiversity Conservation Areas & Site Specific Vegetation; and • Appendix I2 for the Botanical Study and Assessment.				

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

- *1.9. In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for environmental in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint additional specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be undertaken, the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken.*
- *2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.*
- *2.2. Site-specific hydrology and geohydrology has been detailed on pages 66 to 68 of the DSR. The description provided, extracted from previously compiled reports, clearly indicates that the proposed mining expansion area and the establishment of mining activities across a substantial area shall have a significant impact on groundwater resources. Thus, it is recommended that input be obtained from a suitably qualified and experienced geohydrologist to inform the EIR phase. Per paragraph 2.1. above, the Plan of Study for the EIA should be amended to include a Geohydrological Impact Assessment.*

The FSR identified the following specialist studies deemed applicable to this application:

- Botanical Impact Assessment;
- Archaeological Impact Assessment; and
- Palaeontological Impact Assessment.

DMRE approved the FSR on 02 October 2020 and did not request additional specialist studies to be conducted.

- *2.4. Storm-water runoff must be controlled to ensure that on-site activities do not culminate in off-site pollution, erosion or sedimentation. It is recommended that the EIR phase make provision for the inclusion of a storm water management plan. Such a storm water management plan should also describe the proposed methods to prevent contaminated or polluted storm water from being released into the receiving environment, with attention paid to potentially sensitive areas yet to be identified by specialists during investigation of the proposed mine expansion area.*

- Refer to Appendix Q for a copy of the Storm Water Management Plan.

- *2.5. Although acknowledged that the proposed mining method may limit the pollution potential (as stated on page 27 of the DSR), it is noted that pollution and contamination may still occur and it is recommended that potential pollution impacts due to mining activities, are more thoroughly considered. It is essential that identified pollution impacts are adequately addressed and management measures must be proposed in the Environmental Management Programme ("EMPr") to be submitted with the EIA Report.*

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

- Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.5 Waste Management Programme;
- Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts;
- Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management;
- Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;
- Part B(1)(d)(ix) Impacts to be mitigated in their respective phases;
- Part B(1)(g-k) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including monitoring of impact management actions, monitoring and reporting frequency, responsible person, time period for implementing impact management actions, mechanism for monitoring compliance; and
- Part B(1)(m)(ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

☒ *3.1. Table 1, page 14 of the DSR indicates the applicable listing notices and listed activities, without providing an explanation of the listed activities. Please discuss or write out each applicable listed activity for better understanding by interested and affected parties of the listed activities.*

- Refer to Part A(1)(d)(i) Listed and specified activities.

☒ *3.2. Page 20 of the DSR indicates that alternative dust suppression methods will be utilised; however, these methods were not indicated. Since the Western Cape is a water scarce province, the applicant must ensure that only non-potable water is used for dust suppression. Dust suppression measures must be detailed in the EMPr.*

- Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3.4 Water Use; and
- Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Air and Noise Quality.

☒ *3.3. Waste management impacts, including inter alia, the storage, handling, transport and disposal of all waste types, must be addressed in the EMPr.*

- Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.5 Waste Management Programme;
- Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts;
- Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management;
- Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;
- Part B(1)(d)(ix) Impacts to be mitigated in their respective phases;
- Part B(1)(g-k) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including monitoring of impact management actions, monitoring and reporting frequency, responsible person, time period for implementing impact management actions, mechanism for monitoring compliance; and

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
• Part B(1)(m)(ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.					
Other Competent Authorities affected	-	-	-	-	-
Breede-Gouritz Catchment Management Agency (BGCMA)	X	26 February 2020	S Lupa commented as follows on the project.	Greenmined responded to the BGCMA on 28 February 2020 as listed below.	Appendix H – Proof of Public Participation

Comments received from BGCMA:

"The Breede-Gouritz Catchment Management Agency (BGCMA) has received the Notice of Application as indicated above on 30 January 2020. BGCMA has no objections to the proposed development. However, the following is noted:

a) There's little to no stockpiling is required and no washing of sand is needed which means that the sand mining operation will not require the use of water; and
b) The mining footprint will expand over an area classified as a phase 2 FEPA (Freshwater Priority Area) according to the National Wetlands and NFEPA map of SANBI. Therefore, the conservation status of the area will be assessed and discussed during the EIA process of this application.

Therefore, through acknowledgment of watercourses (drainage lines) in the area earmarked for sand mining expansion, impacts on the watercourses should be evaluated in the EIA process as they will assist in the type of Water Use Authorisation triggered by the proposed sand mining activities. BGCMA would therefore, make final comments when the impacts on the watercourses (drainage lines) have been properly evaluated under the EIA process.

General

- No water must be taken from a water resource for any purpose without authorisation from the National Water Act, 1998 (Act 36 of 1998).
- No water or water containing waste may be disposed without authorisation from the National Water Act, 1998 (Act 36 of 1998) and National Environmental Management: Waste Act, 2008 (Act 59 of 2008).
- No unauthorised activities should take place within a regulated area of a watercourse.
- All relevant sections and regulations of the National Water Act, 1998 (Act 36 of 1998) regarding water use must be adhered to.

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
⁎ No pollution of surface water or groundwater resources may occur. ⁎ Stormwater management must be addressed in terms of flooding, erosion and pollution potential. ⁎ No stormwater runoff from any premises contain waste, or water containing waste emanating from industrial activities and premises may be discharged into a water resources. Polluted stormwater must be contained. Please be advised that no activities may commence without the appropriate approvals/authorisations where needed from the responsible authority. The onus remains with the registered property owner to confirm adherence to any relevant legislation that such activities might trigger and/or need authorisation for. This office reserves the right to amend and revise its comments as well as to request any further information."				
Response from Greenmined to the comments received: "Greenmined herewith acknowledge receipt of your correspondence received 27 February 2020 on the proposed Section 102 amendment application of Zandberg Sandput (Pty) Ltd in the Robertson area. We registered the Breede-Gouritz Catchment Management Agency (BGCMA) as a stakeholder on the project, and will henceforth keep you posted on the progress of the Environmental Impact Assessment process as well as supply you with a copy of the draft scoping report (DSR) for your perusal. Your comments will be incorporated and addressed as part of the EIA documents that will all be available for public perusal. We trust you find this in order. Please do not hesitate to contact me in the event of any uncertainties."				
Cape Winelands District Municipality (CWDM)	**X**	Any comments received from the CWDM (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
CapeNature	**X**	03 February 2020	Mr Rhett Smart requested a copy of the Scoping Report for the attention of Me Vicki Hudson.	Greenmined acknowledged receipt of the request on 6 February 2020 and supplied CN with a copy of the DSR on 12 June 2020 for their perusal. No additional comments were received from CN.	Appendix H – Proof of Public Participation
Department of Agriculture, Forestry and Fisheries (DAFF)	**X**	Any comments received from DAFF (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Department of Economic Development and Tourism (DEDT)	**X**	Any comments received from DEDT (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		

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 Labour (DoL)	X	Any comments received from DoL (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.			
Department of Rural Development and Land Reform (DRDLR)	X	Any comments received from DRDLR (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.			
Department of Social Development (DSD)	X	Any comments received from DSD (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.			
Heritage Western Cape (HWC)	X	28 January 2020	Me Waseefa Dhansay requested a NID to be submitted to HWC for their perusal.	The NID was submitted to HWC on 10 February 2020.	Appendix H – Proof of Public Participation

On 19 February 2020, HWC responded on the NID as follows:

"Heritage Western Cape is in receipt of your application for the above matter received on 10 February 2020. This matter was discussed at the Heritage Officers meeting held on 17 February 2020. You are hereby notified that, since there is reason to believe that the proposed development will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following:

- Archaeological Impact Assessment;
- Palaeontological Impact Assessment;

The required HIA must have an integrated set of recommendations. The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied. Please note, should you require the HIA to be submitted as a Phased HIA, a written request must be submitted to HWC prior to submission. HWC reserves the right to determine whether a phased HIA is acceptable on a case by case basis.

This decision is subject to an appeal period of 14 working days. The appeal period shall be taken from the date above. It should be noted that for an appeal to be deemed valid it must refer to the decision, it must be submitted by the due date and it must set out the grounds of the appeal. Appeals must be addressed to the official named above and it is the responsibility of the appellant to confirm

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
that the appeal has been received within the appeal period. Applicants are strongly advised to review and adhere to the time limits contained the Standard Operational Procedure (SOP) between DEADP and HWC. The SOP can be found using the following link http://www.hwc.org.za/node/293. HWC reserves the right to request additional information as required."					
Response received from HWC on the DSR notification: "Please note in order for HWC to provide a formal comment the proposal, a formal Notification of Intent to Develop is required to be submitted."					
Greenmined responded on 15 June 2020 as follows: "The NID for the project was already submitted on 10 February 2020, upon which HWC responded with a request for an HIA on 19 February 2020 (see attached). The specialists were accordingly commissioned to do the HIA (inclusive of a palaeontological opinion). However, as HWC is registered as an I&AP on the EIA process the notice that the draft Scoping Report (DSR) is ready for comments were sent to you as a curtsy and to keep you informed on the process. We also loaded the DSR onto the SAHRIS website for ease of reference. As soon as the HIA is ready we will load it onto SAHRIS and notify you accordingly. The HIA will also form part of the draft Environmental Impact Assessment Report to be compiled upon approval of the final Scoping Report."					
HWC responded (15 June 2020) that they will await the submission of the HIA and provide comments thereon.					
ACO Associates CC was appointed to conduct the HIA (inclusive of a palaeontological opinion) that was uploaded onto the SAHRIS website for perusal and commenting of HWC on 27 July 2020. The findings of the HIA was also incorporated into the DEIAR. To date no additional response was received from HWC.					
South African Heritage Resources Agency (SAHRA)	X	Any comments received from SAHRA (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.			
OTHER AFFECTED PARTIES		-	-	-	-
INTERESTED PARTIES		-	-	-	-
Deo Volente Sand-mine (Me Satchel)		10 February 2020	Me Deb Satchel registered as I&AP on the project.	Greenmined acknowledged receipt of Me Satchel's registration on 10 February 2020	Appendix H – Proof of Public Participation

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
			and confirmed that she will be notified of the DSR for her perusal. Me Satchel was informed of the availability of the DSR on 12 June 2020. To date no additional comments were received.	

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 pre-mining (in terms of the proposed extension area) biophysical-, cultural- and socio-economic environment of the larger study area. It is important to note that the Zandberg Sand Mine has been operational for approximately 26 years, and through the years developed into a landscape feature. The following discussion of the type of environment to be affected therefore includes the *status quo* associated with the extension area.

PHYSICAL ENVIRONMENT

CLIMATE

The Robertson area receives an average of 255 mm of precipitation per year (left chart). The highest rainfall usually occurs in August averaging 35 mm, while the lowest occurs in January with an average of 8 mm. The monthly distribution of average daily maximum temperatures (middle chart) shows that the average midday temperatures range from 16.7˚C in July to 29˚C in February. The region is the coldest during July (4.2°C on average). Consult the chart below (right) for an indication of the monthly variation of average night-time temperatures.

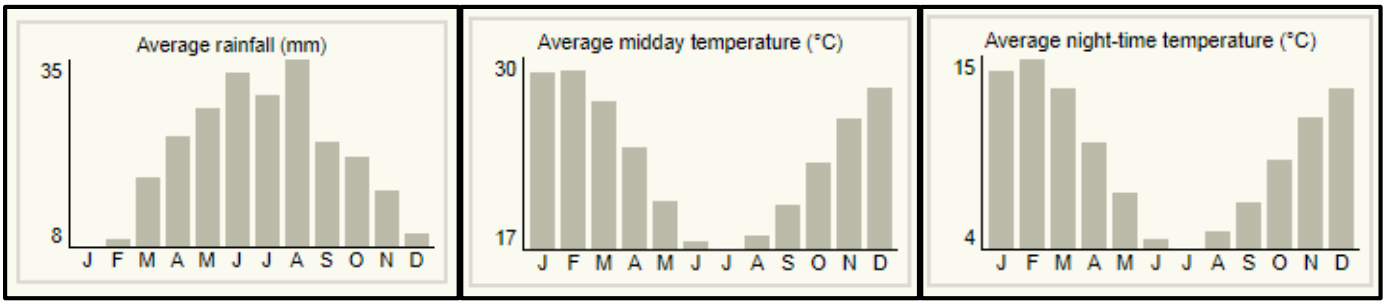


Figure 9: Charts showing the climatic averages of the Robertson area (information obtained from SAExplorer).

During the summer/spring months the south to south-eastern wind dominates in the Robertson area (blowing in a northern direction), whilst during the winter/autumn months the west-north-western wind is dominant as presented in the figure below. According to the data of windfinder.com the average wind speeds range from 4 – 6 kts during the year.

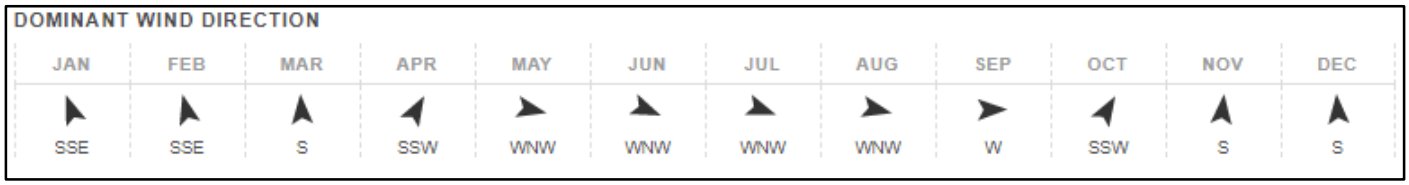


Figure 10: Dominant wind direction of the Robertson area (information obtained from windfinder.com).

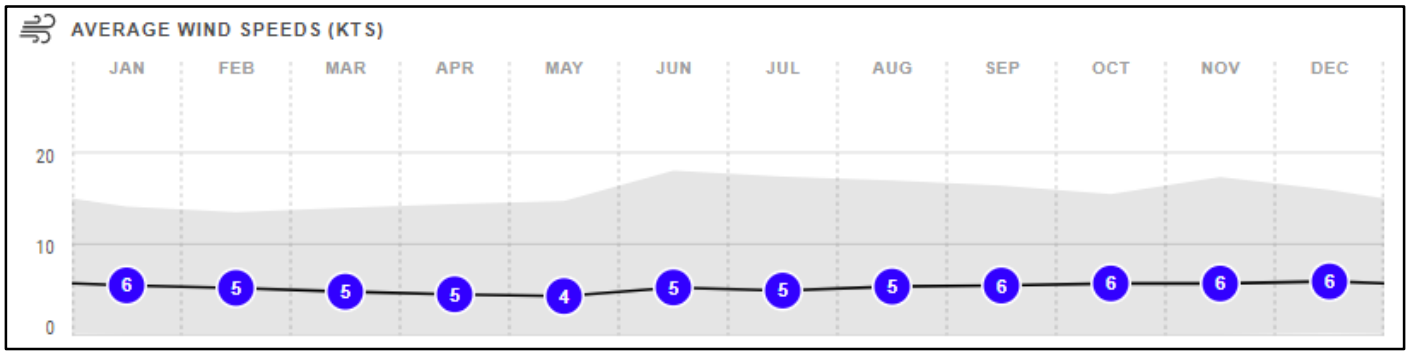


Figure 11: Average wind speeds of the Robertson area (information obtained from windfinder.com).

TOPOGRAPHY

The north-western boundary of the farm Zandberg fontein extends up the leeward side of the Zandberg mountain that divides the northern Breede River valley from the southern highly undulating area. The topography of the area is described as a steep to moderately sloping terrain. The altitude of the proposed extension area lays between 437 masl along the north-western boundary and 208 masl at the south-eastern corner.

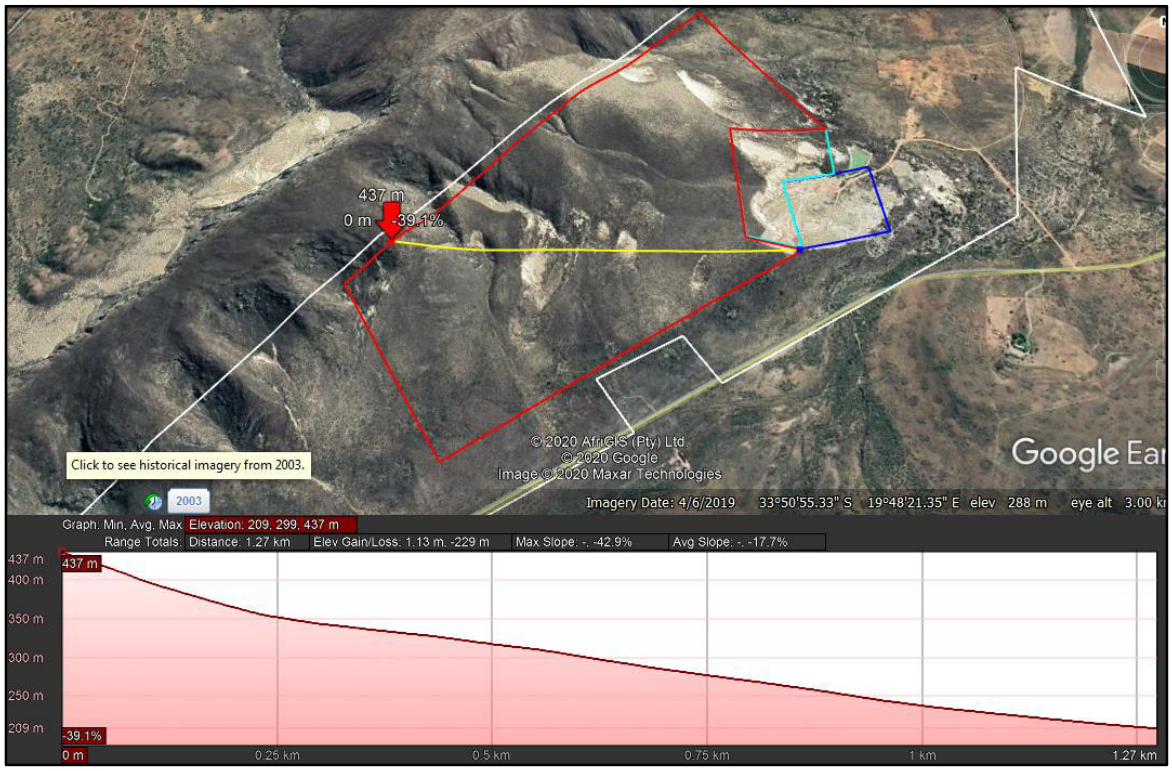


Figure 12: Elevation profile of the area (image obtained from Google Earth).

VISUAL CHARACTERISTICS

Portion 4 of the farm Zandberg fontein No 97 is zoned for agricultural use with a mostly undisturbed footprint. Presently, sand mining has been done over approximately 9 ha of the farm with a dam established to the north of the mining area. Owing to the elevation of the site most of the farm is visible from the La Chasseur/Agter-Kliphoogte road passing the farm to Robertson as well as the farms opposite the road. In light of this the proposed extension area will be visible from the north, east, south and south-west. The Zandberg screens the operation to the north-west/north.

AIR AND NOISE QUALITY

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 surrounding area has since been transformed with the introduction of small scale sand mining, viticulture (nearer to Robertson) and the movement of traffic along the La Chasseur/Agter-Kliphoogte road, all of which affects the air and noise ambiance of the study area. Mining at the Zandberg Sand Mine contributes the emissions of one FEL and ±10 trucks/day to the receiving environment. Should the S102 application be approved, the extension of the footprint

will not cause a cumulative impact as mining will gradually progress into the extension area while the current mining method will persist.

GEOLOGY AND SOIL

(Information extracted from the Environmental Management Programme Report of Zandberg Sand Mine, 2014)

The geology of the study area is known for its acidic lithosol soils derived from Ordovician sandstones of the Table Mountain Group, as well as recent aeolian sand accumulations of riverine origin (Breede River). The sand deposit is situated on the leeward side of the Zandberg mountain.

The ENPAT (Environmental Potential Atlas for South Africa) agricultural dataset indicates that the soils of the study area are not suitable for arable agriculture but can still be used for grazing. Sand "blow-outs" is visible in the surface in various places on the property.

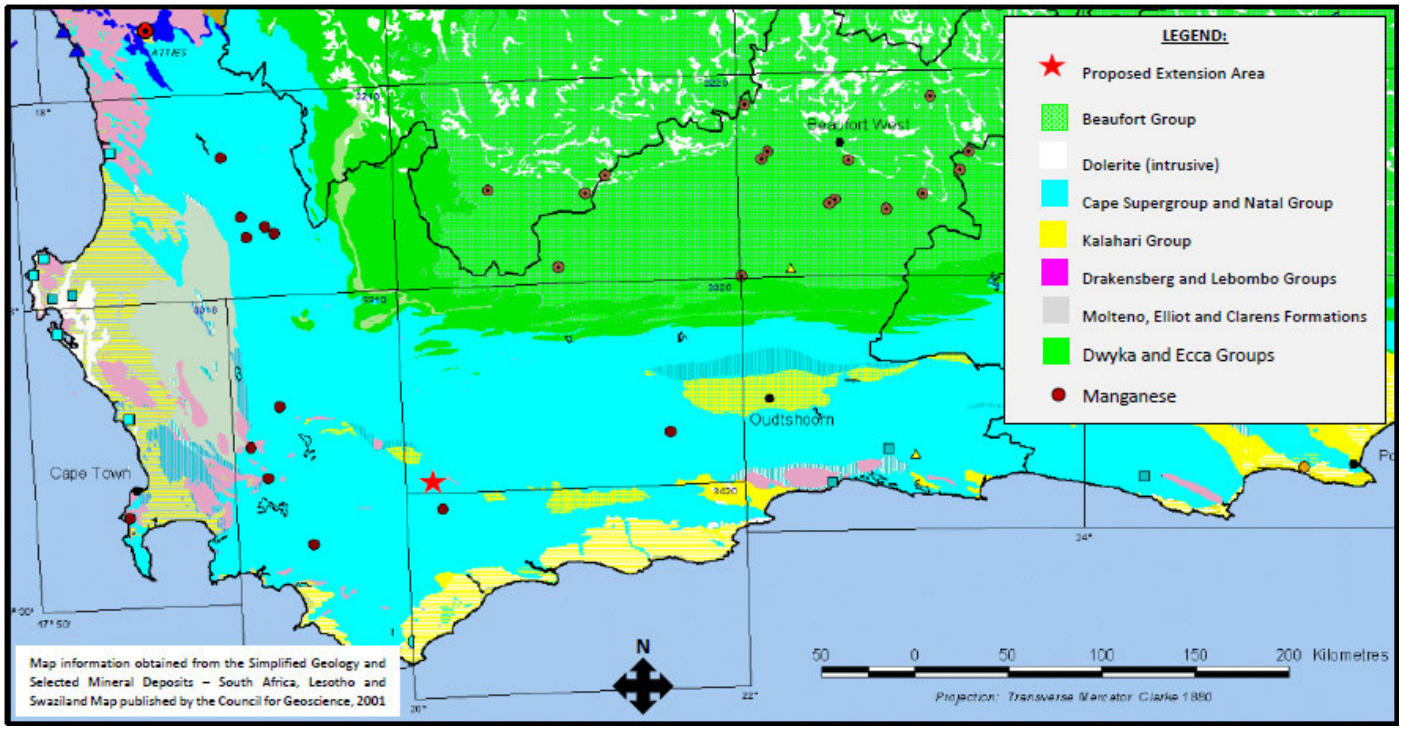


Figure 13: Indication of the simplified geology of the study area, where blue represents the Cape Supergroup and Natal Group within which the proposed extension area is situated. The proposed extension area is indicated by the red star. (Image obtained from the Council for Geoscience)

HYDROLOGY AND GEOHYDROLOGY

The study area is located within the Upper Breede Sub-Water Management Area which is managed as part of the Breede Water Management Area by the Department of Water and Sanitation (DWS). Portion 4 of Zandberg fontein 97 falls within the H40J quaternary catchment. There are no dams, rivers or wetlands in the proposed

extension footprint, however it extends over an area classified as a Phase 2 FEPA (Freshwater Priority Area) according to the National Wetlands and NFEPA map of SANBI. The Lexicon of Biodiversity Planning in South Africa defines a FSA as: *"Phase 2 FEPAs were identified in moderately modified (C) rivers. The condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once good condition FEPAs (in an A or B ecological category) are considered fully rehabilitated."*

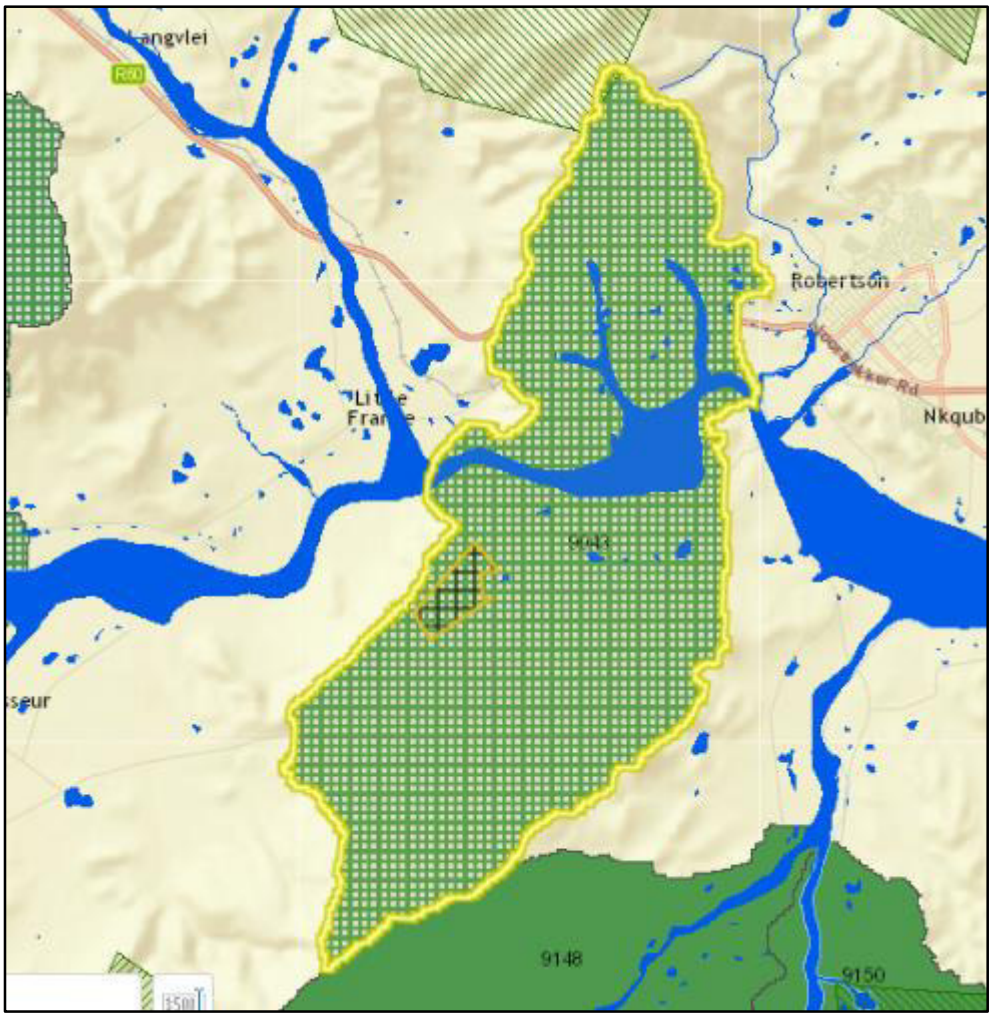


Figure 14: Map showing the position of the Phase 2 FEPA (crossed green polygon) in relation to the proposed extension area (orange polygon) and the Breede River (blue polygon). (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

Broad scale wetland mapping conducted by the National Wetlands and National Freshwater Ecosystem Priority Areas (NFEPA) initiative does not show any water feature within the earmarked extension boundaries (figure below).

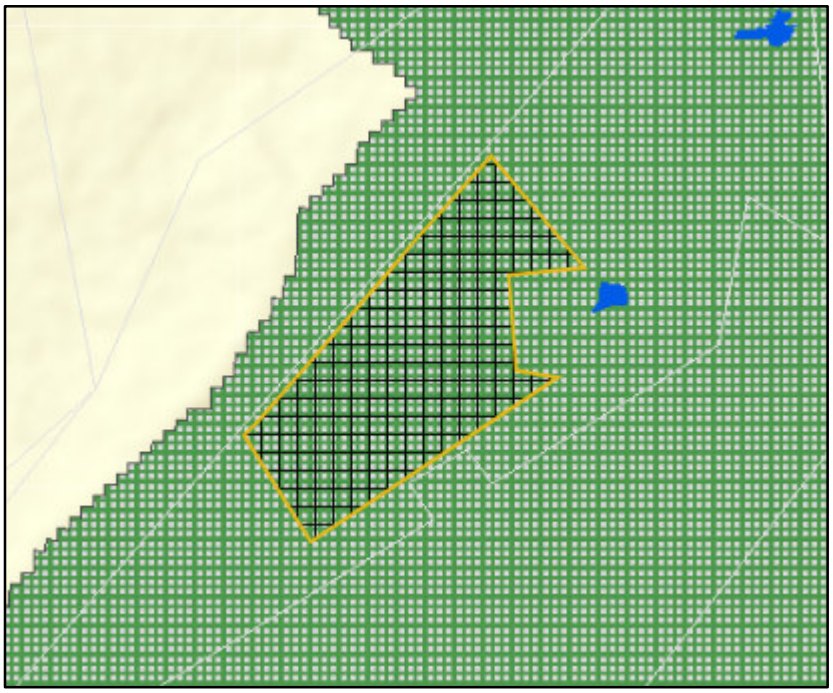


Figure 15: Map on a smaller scale showing the position of only one water body (blue polygon showing the dam of the farm) in close proximity to the proposed extension area (orange polygon). (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

It is known that the water table in the valley below the mine is ±3 m under the surface. A borehole in the valley indicated that the groundwater is artesian.

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 layered over the Mining and Biodiversity Map, as shown in the figure below, the entire mining footprint is classified as highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline's describes areas of highest biodiversity importance as: "*these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being."* The guideline notes that environmental screening, the EIA and specialists should focus on confirming the

presence and significance of biodiversity features, and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.

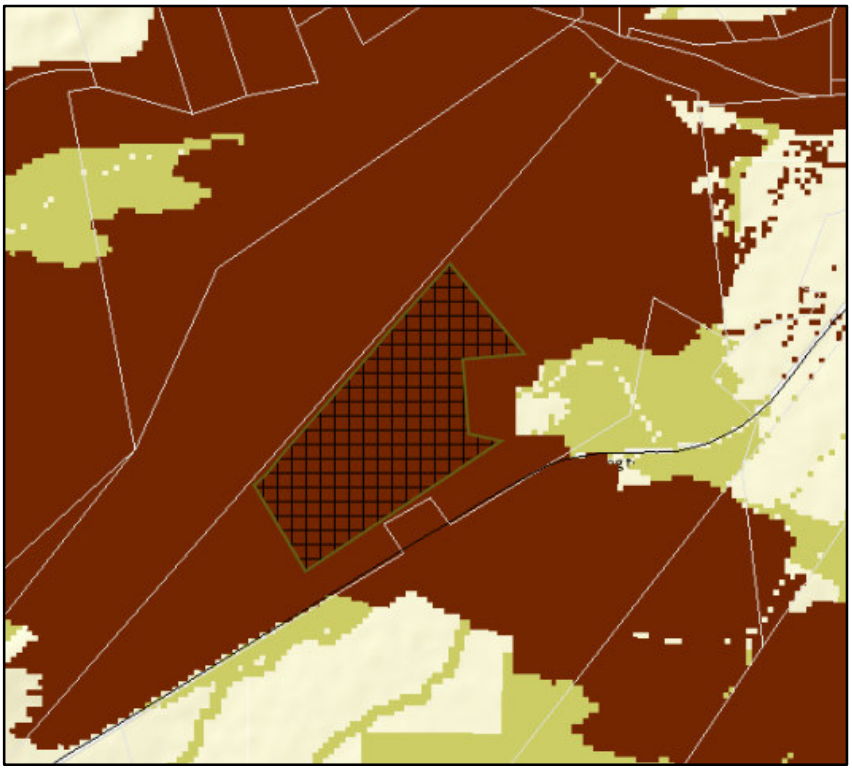


Figure 16: The Mining and Biodiversity importance map overlain by the proposed extension area (crossed polygon). Dark brown – highest biodiversity importance, highest risk for mining, sand colour – moderate biodiversity importance, moderate risk for mining. (Image obtained from the BGIS Map Viewer: Mining Guidelines)

BIODIVERSITY CONSERVATION AREAS

(Refer to the Botanical Study and Assessment for the Sand Mine near Robertson, Western Cape Province – April 2020 attached as Appendix I2)

National Protected Areas Expansion Strategy (NPAES):

The proposed extension area is located outside any NPAES Areas (see figure below), any Formal Protected-, or Informal Protected Areas. The nearest NPAES Area is located approximately 1.03 km south-east (Vrolijkheid), whilst the nearest Informal Protected Area is located ±7.8 km to the south-west (Skuilkrans Private Nature Reserve). The nearest Formal Protected Area, the Langeberg-Wes Mountain Catchment Area, is located 7.6 km north of the project site. Subsequently this development will not have an impact on the national ecosystem-specific protected area targets.

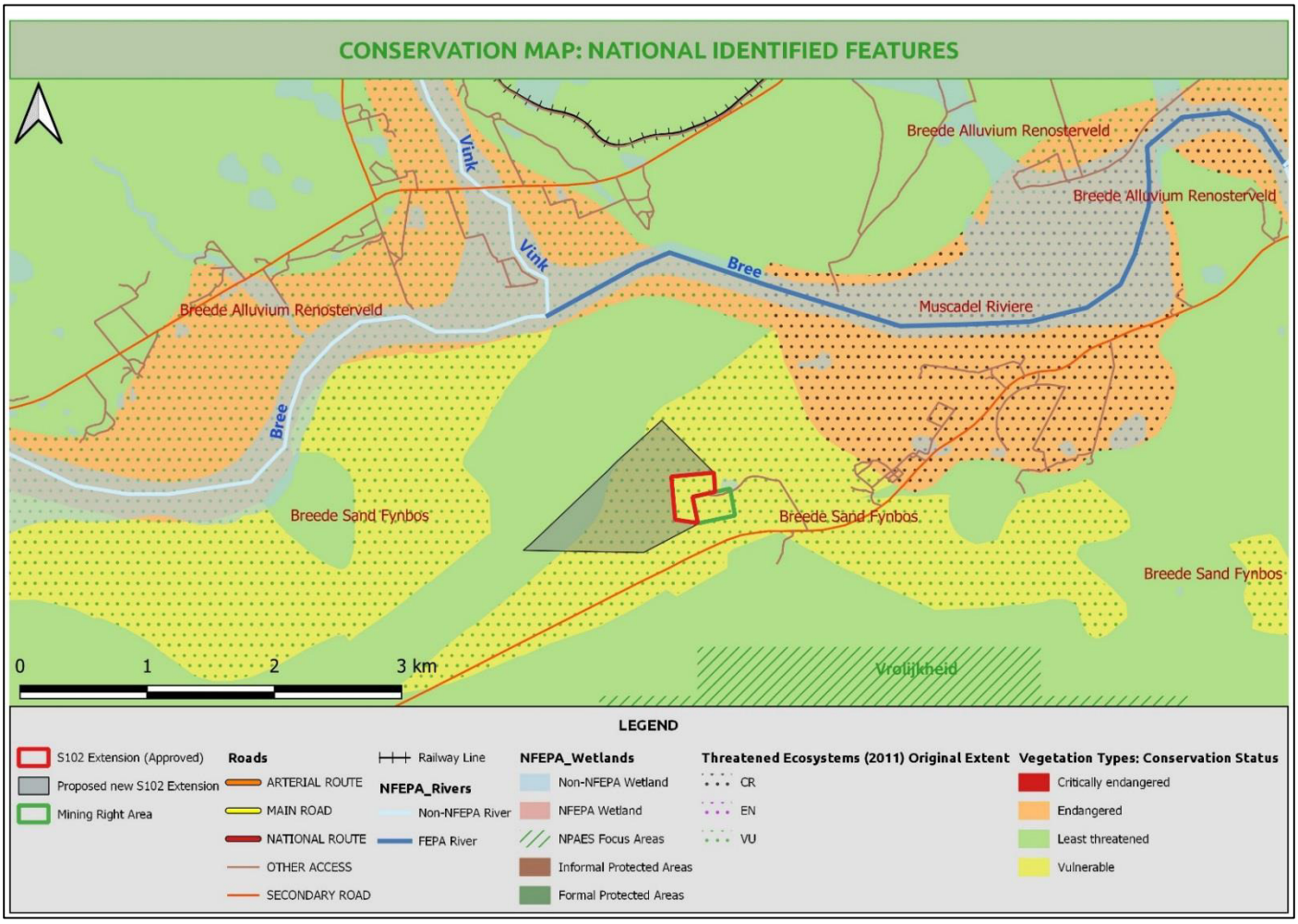


Figure 17: Map illustrating the various conservation priority areas found within the greater surroundings of the proposed mining site (image obtained from the BSA)

National Level of Conservation Priorities (Threatened Ecosystems):

The study area is located within two vegetation units according to Mucina and Rutherford (2006), namely Breede Sand Fynbos and North Sonderend Sandstone Fynbos. Currently, the first unit, namely Breede Sand Fynbos, is classified as Vulnerable, since only 2% is protected in the Hawequas and Quaggas Berg Private Nature Reserves, while none of the unit is conserved in statutory conservation areas, and some 45% of the area has been transformed. Thus, the conservation target of 30% is likely attainable, but will probably not be realized since only 2% is currently protected. The second unit, namely North Sonderend Sandstone Fynbos, is classified as Least Threatened, since 21% of the 30% conservation target is statutorily conserved in the Riviersonderend Nature Reserve, with an additional 51% mainly in a private conservation area of the same name, while only low levels of transformation has occurred.

Furthermore, this site falls within a broader area which is also listed within the Threatened Ecosystem List, 2012 (NEM:BA) as a Vulnerable Ecosystem (Breede Sand Fynbos Ecosystem) and correlates with the Breede Sand Fynbos Vegetation Type as classified by Mucina and Rutherford, 2012. This ecosystem is very fragmented, occurring as dune plumes and dune seas in the valley bottoms primarily south of the Breed River and cover a total combined area of approximately 9 000 ha.

The project site is located on a dune plume (Breede Sand Fynbos) that covers an area of approximately 597 ha. Due to the low agricultural and developmental potential of this dune plume most of this ecosystem is largely intact with minimal disturbance and transformation (mostly associated with the foot of the dune in the form of roads, small farm dams and the existing mining area), mostly containing a stable climatic vegetation cover providing stability to the highly dispersive sand plume. Small isolated patches of this sand plume / dune contain unstable areas with a sparse vegetation cover.

Due to the high impact nature of mining activities, which essentially removes all vegetation as well as the majority of topsoil, leaving an area with minimal rehabilitation potential (in terms of rehabilitation of a vegetation cover that resembles the original natural vegetation cover that was removed), the proposed development will result in the local loss of some functions and services. However, the area that will be transformed will only cover 2.92% of total area of this sand plume. Furthermore, when taking into account the total combined size of all such dune plumes and dune seas that are covered by the Breede Sand Fynbos Vegetation Type / Ecosystem an area of less than 1% (0.19% of 9277 ha) of this vegetation type / ecosystem will be impacted. Subsequently it is unlikely that this development will influence the status of this vegetation type / ecosystem.

Critical Biodiversity Areas and Broad Scale Ecological Processes:

According to the 2017 Western Cape Biodiversity Spatial Plan (WCBSP), the Langeberg Critical Biodiversity Area 1 (CBA) extends across the earmarked area (refer to following figure). The WCBSP provides the following information regarding a CBA:

- Critical Biodiversity Area (CBA):

  Definition: "*Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure*."

Management Objective: "*Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.*"

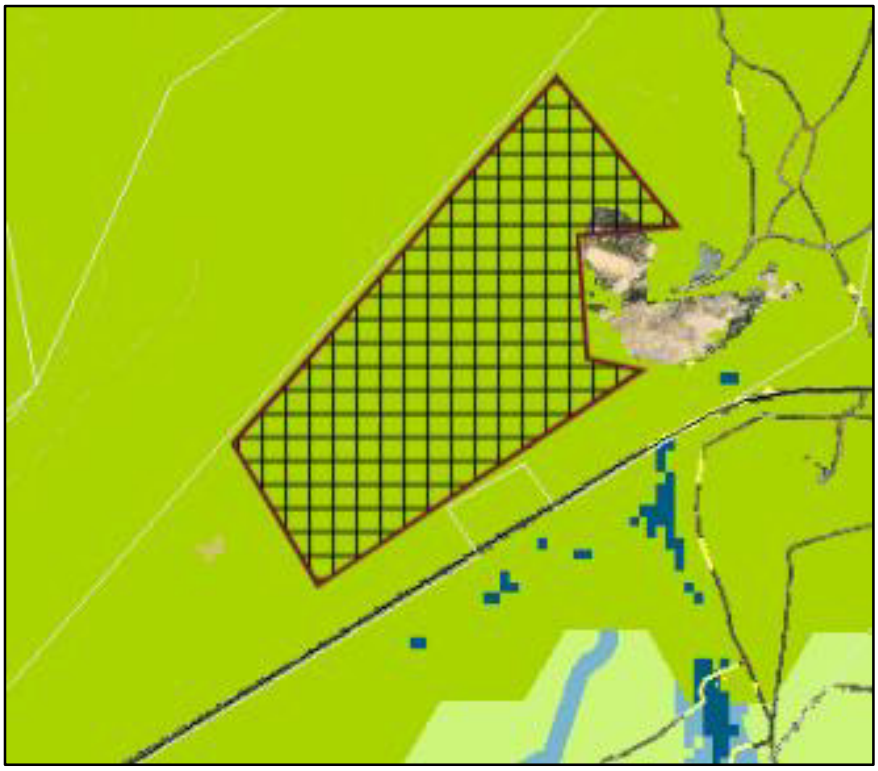


Figure 18: 2017 Western Cape Biodiversity Spatial Plan showing the footprint of the earmarked extension area (crossed polygon), in relation to the Langeberg CBA 1: Terrestrial (green). (Image obtained from the BGIS Map Viewer: 2017 Western Cape Biodiversity Spatial Plan)

The BSA confirmed that the entire mining footprint is located almost entirely within a CBA1, together with some randomly scattered pixels of CBA2, and a small unclassified portion. The insignificant and random nature of the CBA2 pixels are likely a side-effect of the algorithm used to generate the CBA spatial layers, and ground-truthing confirmed the entire site to conform to CBA1 criteria, including the portion not originally classified.

VEGETATION

(Refer to the Botanical Study and Assessment for the Sand Mine near Robertson, Western Cape Province – April 2020 attached as Appendix I2)

According to Mucina and Rutherford (2012) the extension area lays over two vegetation types known as the Breede Sand Fynbos (FFd8) and the North Sonderend Sandstone Fynbos (FFs13).

Breede Sand Fynbos:

The Breede Sand Fynbos (FFd8) vegetation type is fragmented, occurring as dune plumes and dune seas in the valley bottoms primarily south of the Breede River, also extending up the sides of adjacent hills. The vegetation is characterised as an open proteoid tall shrubland combined with an open to medium dense restioid herbland in undergrowth (Mucina & Rutherford, 2012). Important taxa include amongst others: *Leucospermum rodolentum* (d), *Metalasia densa*, *Protea laurifolia, Afrolimon longifolium*, *Aspalathus heterophylla*, *Euchaetis pungens*, *Lachnospermum fasciculatum*, *Leucadendron brunioides* var. *brunioides*, *L. salignum, Ruschia caroli, Pelargonium senecioides, Romulea setifolia, Cynodon dactylon*, and *Ehrharta villosa* var. *villosa.* The endemic geophytic herb *Ixia pumilio* is known to occur in this vegetation type.

The conservation status of the vegetation type is Vulnerable with the conservation target set at 30%, with none of the unit conserved in statutory conservation areas and only 2% protected in the Hawequas and Quaggas Berg Private Natural Reserve. Mucina and Rutherford reported that 45% of the area has been transformed mainly for pasture and vineyards, as well as a result of the Brandvlei and Kwaggaskloof Dams.

North Sonderend Sandstone Fynbos:

The North Sonderend Sandstone Fynbos (FFs13) vegetation type is known as an open, tall, proteoid-leaved evergreen shrubland with a dense moderately tall, ericoid-leaved shrubland as understorey. This is mainly asteraceous fynbos on the western and lower slopes, but extensive proteoid and restioid fynbos dominate the middle slopes. Ericaceous fynbos is restricted to the highest peaks. The deep sand habitat of the northern plateau, which runs along the length of the mountain, is a distinctive feature associated with many endemic species (Mucina & Rutherford, 2012). Important taxa includes amongst others: *Acacia karroo*, *Cunonia capensis*, *Metrosideros angustifolia*, *Protea nitida, Protea neriifolia* (d), *P. repens* (d), *Polygala fruticosa*, *Protea laurifolia*, *Rhus pyroides, Agathosma leptospermoides*, *Athanasia oocephala*, *Cliffortia ruscifolia*, *Elytropappus glandulosus*, *Erica denticulata*, *E. globiceps* subsp. *zeyheri*, *E. jonasiana*, *E. lateralis*, *E. modesta*, *E. plukenetii* subsp. *plukenetii*, *E. serrata*, *Paranomus adiantifolius*, *P. capitatus*, *Passerina burchellii*, *Phaenocoma prolifera*, *Prismatocarpus lycioides*, *Protea amplexicaulis*, *P. cynaroides*, *P. humiflora*, *P. lorifolia*, *P. scabra*, *P. subulifolia, Serruria gremialis*, *S. viridifolia, Stoebe spiralis, Drosanthemum leptum*, *Ruschia acutangula, Edmondia sesamoides*, *Ursinia oreogena*, *Gladiolus atropictus, Ehrharta ramosa* subsp. *aphylla*, *Hypodiscus*

squamosus, *H. striatus*, *Ischyrolepis capensis*, *I. distracta*, *I. gaudichaudiana*, *Pentaschistis eriostoma*, *Restio filiformis.* The endemic taxa include: *Leucadendron burchellii*, *L. immoderatum*, *L. nervosum*, *Leucospermum harpagonatum*, *Serruria stellata*, *S. williamsii*, and *Spatalla argentea.*

The conservation status of the vegetation type is Least Threatened with the conservation target set at 30%. 21% of the vegetation type is statutorily conserved in the Riviersonderend Nature Reserve, with an additional 51% mainly in a private conservation area of the same name. Mucina and Rutherford reported that only 2% of the area has been transformed mainly for protea nurseries and fruit orchards.

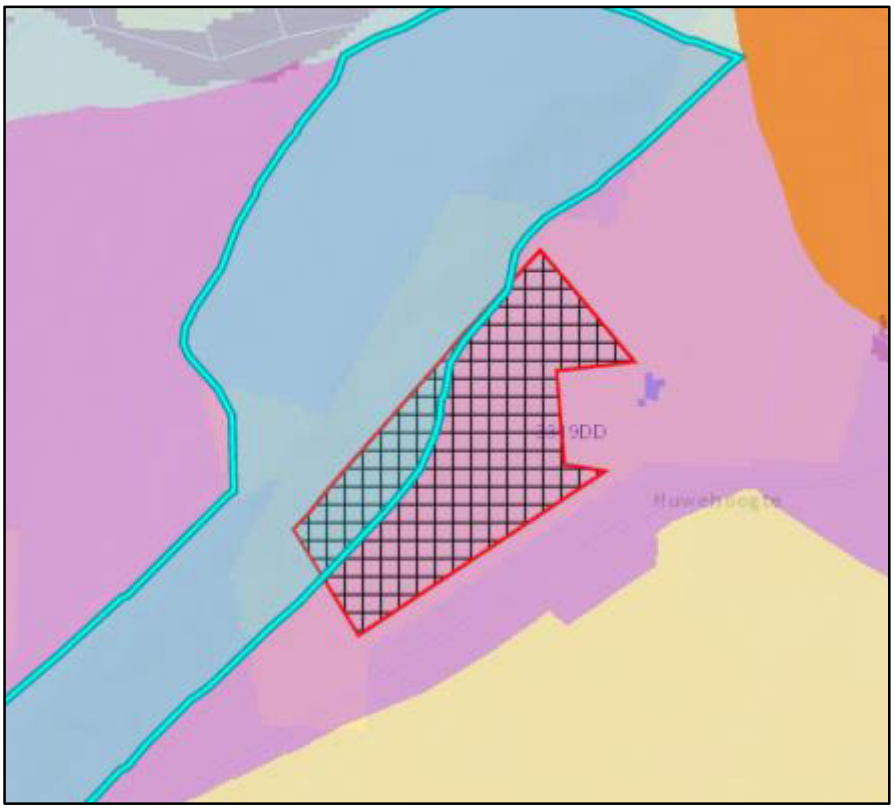


Figure 19: National vegetation cover map showing the distribution of FFd8 Breede Sand Fynbos (pink shaded area) and FFs13 North Sonderend Sandstone Fynbos (blue shaded area). The study area is shown by the crossed polygon. (Image obtained from the BGIS Map Viewer – National Vegetation Map).

The tables below provide a summary of the conservation status of the two vegetation types.

Table 11: Summary of the conservation status of the Breede Sand Fynbos (FFd8).

Conservation Target (% of area)	30%
Protected (% of area)	2% (Non-statutorily)
Remaining (% of area)	55%

Description of conservation status	Vulnerable

Table 12: Summary of the conservation status of the North Sonderend Sandstone Fynbos (FFs13).

Conservation Target (% of area)	30%
Protected (% of area)	21% (Statutorily) 51% (Non-statutorily)
Remaining (% of area)	98%
Description of conservation status	Least Threatened

Species of conservation concern:

A total of 173 red data plant species are known to occur in the broad area surrounding the site, as obtained from the SANBI SIBIS database and Threatened Species Programme, Red List of South African Plants (2011). These species of conservation concern are listed in the BSA attached as Appendix I2. The majority of these species are from the families Proteaceae (protea family; 29 species) and Fabaceae (pea family; 21 species). Furthermore, it includes 104 Threatened Species (8 Critically Endangered, 31 Endangered species, 65 Vulnerable). The online list includes a much broader area than the actual site, and as a result, the actual number of species of conservation concern which might occur within the site should be significantly less. However, this precautionary measure of including a larger area allows for adequate information to be extracted and evaluated. A total of 521 species have been recorded within the extracted areas which are Protected (Schedule 4) within the Nature Conservation Ordinance No. 19 of 1974. The high number of protected flora is mainly due to the fact that all species within the families Amaryllidaceae, Bruniaceae, Ericacea, Iridaceae, Orchidaceae, Proteaceae and Rutaceae are protected and are families which are well represented within this region. Only one national protected tree (under the National Forests Act, 1998 – Act No. 84 of 1998) has been recorded, namely *Podocarpus elongatus*.

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

FAUNA

(Information extracted from the Specialist Vegetation/Ecological Survey prepared by Ian Oliver, 2010 – see Appendix I1)

Fauna that may be present on, or visit the study area, comprises of birds such as doves, starlings, and sparrows as well as commonly found insects and reptiles. The landowner keeps livestock, but to date no protected or red data faunal species were identified to be resident within the approved mining area or proposed extension footprint.

The mine's EMPR notes that smaller reptiles on site may include the Padloper/Parrot-beaked tortoises (*Homopus* species) and Angulate (Ploegskaarskilpad) tortoise (*Cherisina angulata*). According to the EMPR, the Namaqua Dwarf Chameleon (*Bradypodion occidentale*) should be in the area, especially as there is very little human habitation. Mammals that may exist could include Cape Grey Mongoose (*Herpestes pulverulentus*), Cape Grysbok (*Raphicerus melanotis*) and Porcupine (*Hystrix africaeaustralis*) (Oliver, 2010).

HUMAN ENVIRONMENT

CULTURAL AND HERITAGE ENVIRONMENT

(Refer to the Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm Zandbergfontein, Robertson, Western Cape – Appendix J)

The earmarked area is situated on a farm approximately 7 km south-west of the town of Robertson. Robertson was founded in 1853, however before the founding of the town, Simon van der Stel developed the farming lands in the region around 1679. Farmers were attracted to the region as it had fertile land and was good for grazing sheep. Wine farming in Robertson picked up speed when the Cogmanskloof pass connected the farmers with Montagu in 1877. By the mid-1800's, sheep and mixed farming was popular in the Robertson district. The MR Holder has been mining sand from the property for the past 26 years. Sand mining, on this property, however commenced in the 1980's with the surrounding areas mainly used for grazing by the landowners.

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 extension area is placed on the PSM, it shows the study area to extend over areas of high (orange) concern as presented in the figure below. In light of this, a palaeontological desktop study is required and based on the outcome of the desktop study, a field assessment is likely.

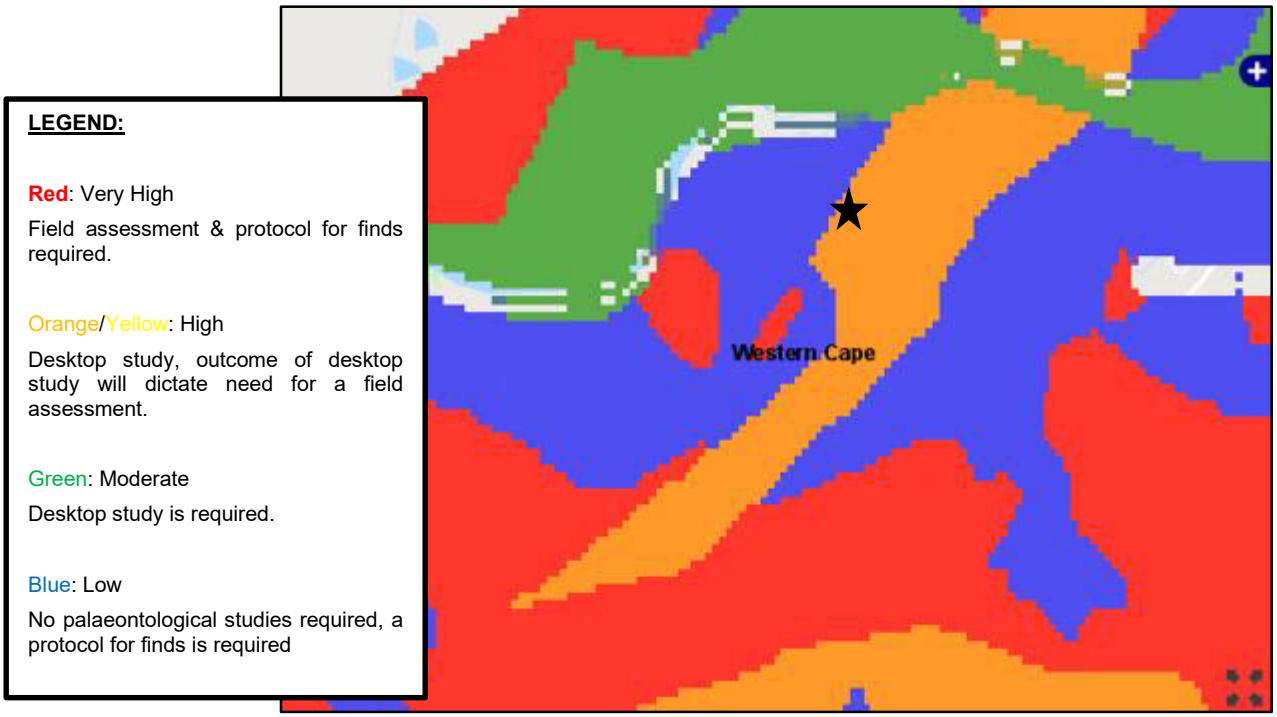


Figure 20: The SAHRA palaeontological sensitivity map shows that the proposed extension footprint (black star) extends over an area of high concern (Orange) (image obtained from the PalaeoSensitivity Map on SAHRIS).

A Notice of Intend to Develop was submitted to Heritage Western Cape on 10 February 2020, upon which an Archaeological Impact Assessment and Palaeontological Impact Assessment were requested (by HWC). The appropriate specialists were appointed and their findings were incorporated into the DEIAR and the HIA was uploaded onto the SAHRIS website. Refer to 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 Zandberg Sand Mine)

Portion 4 of Zandberg fontein No 97 is situated approximately 7 km south-west of Robertson within the Langeberg Local Municipality which is one of the municipalities situated within the Cape Winelands District.

The Langeberg Municipality includes the towns of Ashton, Bonnievale, McGregor, Montagu and Robertson, as well as rural areas adjacent to and between these towns. Robertson is one of the largest wine-producing regions in South Africa. The area is best known for its wine, but a variety of diverse attractions and activities, combined with spectacular scenery and the relaxed hospitality of the people ensure visitors unforgettable stays and a reason to return. The Robertson Wine Valley forms part of the longest wine route in the world - Route 62.

Langeberg has the smallest population in the Cape Winelands District which, according to the forecasts of the Western Cape Department of Social Development, is estimated to be 103 389 in 2017. This total gradually increases across the 5-year planning cycle and is expected to reach ±108 540 by 2023. This equates to an approximate 5.0% growth off the 2017 base estimate. In 2017, Langeberg's population gender breakdown was relatively evenly split between male (50 427, 48.8%) and female (52 963, 51.2%). For 2023, the split is anticipated to be 52 742 (48.6%) and 55 798 (51.4%) for males and females respectively. The coloured community is the dominant population group in the Langeberg area, accounting for 70% of the population; black Africans comprise 16% of the population while whites account for 12%.

The Robertson area's economy is driven by wholesale, retail, trade, catering and accommodation activities which necessitates the need for a more skilled and semi-skilled labour force that is sources from outside of the region, hence the higher population concentration within the 25-29 and 30-34 age groups (compared to the rest of the age groups). The higher concentration in the 45-49 age groups can in turn potentially be attributed to the growing trend of individuals that retire early or downscale to more rural and tranquil communities.

Economic growth at the municipal level is essential for the attainment of economic development, the reduction of poverty and improved accessibility (forward and backwards linkages between the first and second economy). Fostering this growth requires an in-depth understanding of the economic landscape within which each respective municipality operates.

Langeberg comprised R 4.484 billion (or 10.2%) of the District's total R 44.16 billion GDPR as at the end of 2015. GDP growth averaged 4.0% per annum over the period 2005 - 2015. This is above the District average of 3.5%. Average annual growth of 3.0% in the post-recessionary period remained above the District average of 2.8%. Langeberg employed 13.7% (51 545 labourers) of the Cape Winelands District's labour

force in 2015. Employment growth was moderate, averaging 2.5% per annum since 2005, which was above the overall District employment growth rate of 1.9% per annum. Employment growth has nevertheless picked up significantly in the post–recessionary period (2010-2015) averaging 3.7% per annum. Langeberg has experienced significant job losses in the agriculture, forestry and fishing sector and in the manufacturing sector prior to and during the recession. However, 11 810 (net) additional jobs have been created in total since 2005. The semi-skilled sector employed 21.0% of the Municipality's workforce, and rose by 1.7% per annum on average since 2005. The low-skilled sector (which employs 14 774 workers or 28.7% of the Municipality's workforce) experienced a contraction of 1.7% per annum over the past decade. Most of the job losses experienced during the recession emanated from this sector. The skilled sector employed 4 567 workers (8.9% of the workforce), and grew at a moderate rate of 2.6% per annum since 2005. The majority (41.5% or 21 374 workers) of the formally employed workforce operate within the informal sector, which has grown by 9.1% per annum on average since 2005 and absorbed most of the job losses from the low and semi-skilled sectors.

Literacy rate in Langeberg was recorded at 75.3% in 2011 which is lower than the average literacy rates of the Cape Winelands district (81.7%), the Western Cape (87.2%) as well as the rest of South Africa (80.9%).

The annual income for households living within the Langeberg municipal area shows the proportion of people that fall within the low, middle and high income brackets. Poor households fall under the low income bracket, which ranges from no income to just over R 50 000 annually (R 4 166 per month). An increase in living standards can be evidenced by a rising number of households entering the middle and high income brackets. Approximately 56.9% of households in Langeberg fall within the low income bracket, of which 10.0% have no income. Less than fifty per cent of households fall within the middle to higher income categories, split between 37.9% in the middle income group and 5% in the higher income group. A sustained increase in economic growth within the Langeberg municipal area is needed if the 2030 NDP income target of R 110 000 per person, per annum is to be achieved.

Access to emergency medical services is critical for rural citizens due to rural distances between towns and health facilities being much greater than in the urban areas. Within the Cape Winelands District, Langeberg has 0.77 ambulances per 10 000 populations, higher than the District average of 0.42. At the end of March 2016, anti-retroviral treatment (ART) was provided to over 200 000 persons in the Province, 23 172 of whom were in the Cape Winelands District and 2 160 in the Langeberg municipal area.

At the end of March 2016, 372 new ART patients were being treated from 7 treatment sites in the Langeberg municipal area. The most recent information for Langeberg indicates a mother-to-child transmission rate of zero per cent which is lower than the 1.7% District and the 1.4% Provincial rate as well as the medium term annual target for 2015/16 and 2016/17.

In the Langeberg municipal area, 94.7% households have access to flush toilets connected to a sewerage system/flush toilet. Approximately, 4.7% of households must therefore make due with other sources of sanitation, meaning facilities other than flushed and chemical (i.e. pit latrine, ecological toilets and bucket toilets). Access to flush toilets connected to a sewerage system in Langeberg improved by 19.8% from 2011 to 2016 and by 26.0% across the District over the same period.

The majority of households in the Langeberg municipal area has their refuse removed by local authorities at least weekly (79.3%) and a further 3.4% of households have refuse removed by the local authority/private company less often. Refuse removed by local authorities once a week increased by 25.1% from 2011 to 22 2016 and by 21.8% across the District over the same period.

The biggest source of energy for lighting purposes in the Langeberg municipal area in 2016 was electricity whilst 9.1% of households make use of other sources of energy i.e. households that access electricity from a source which they do not pay for, generator, solar home system, battery and other. Access to electricity for lighting purposes improved by 11.1% in 2011 to 18.8% in 2016 across the District over the same period.

(b) Description of the current land uses

Portion 4 of the farm Zandberg fontein No 97 is situated in a rural setting surrounded by other farming properties. The property is approximately 7 km south-west of Robertson bordering the La Chasseur/Agter-Kliphoogte road that serves the residents of the area. Certain sections of the farm are used for grazing, and sand mining. The earmarked property is zoned Agricultural Zone 1 with a consent use for mining approved for the current mining footprint. Agricultural Zone I has agriculture as primary use. In light of this, a land use application needs to be made in terms of the Langeberg Land Use Planning Bylaw (264/2015) and the Langeberg Municipality – Integrated Zoning Scheme Bylaw (7929/2018) to obtain land use rights for the proposed extension area.

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 13: 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 extension footprint is surrounded by natural areas zoned for agricultural use.
Low density residential	-	**NO**	The nearest residential dwelling is ±1.4 km south-east to the mine.
Medium density residential	-	**NO**	-
High density residential	-	**NO**	-
Informal residential	-	**NO**	-
Retail commercial & warehousing	-	**NO**	-
Light industrial	-	**NO**	-
Medium industrial	-	**NO**	-
Heavy industrial	-	**NO**	-
Power station	-	**NO**	-
High voltage power line	**YES**	-	A power line traverses the property and runs parallel with the La Chasseur/Agter-Kliphoogte road. The power line does not enter the proposed extension area.
Office/consulting room	-	**NO**	-
Military or police base / station / compound	-	**NO**	-
Spoil heap or slimes dam	-	**NO**	-
Quarry, sand or borrow pit	**YES**	-	This application entails the extension of the current sand mining footprint on the property.
Dam or reservoir	**YES**	-	A dam of the property lays ±180 m to the east of the extension 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**	-

LAND USE CHARACTER	YES	NO	DESCRIPTION
Landfill or waste treatment site	-	**NO**	-
Plantation	-	**NO**	-
Agriculture	**YES**	-	The proposed footprint extends over an area zoned as Agriculture I, although the groundcover of the proposed extension area is highly natural with little to no disturbance, and is representative of the Breede Sand Fynbos and North Sonderend Sandstone Fynbos vegetation types.
River, stream or wetland	-	**NO**	The Breede River lays ±1.2 km north of the application area, behind the Zandberg. Some drainage lines occur on the opposite (southern) side of the La Chasseur/Agter-Kliphoogte road as well as extends into the proposed extension area.
Nature conservation area	-	**NO**	-
Mountain, hill or ridge	**YES**	-	The application area extends up the leeward side of the Zandberg found on the property.
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

As mentioned earlier, the natural topography of application area can be described as undulating, extending up the southern face of the Zandberg mountain on the property. The earmarked extension area has an average slope of -17.7% (437 masl along the north-western corner to 208 masl at the eastern corner) as shown in Figure 12 above.

Should LA1 be approved the topography of the mineable area has an average slope of -20.1% (383 masl at the north-western boundary to 211 masl at the eastern corner) as shown in Figure 21 below.

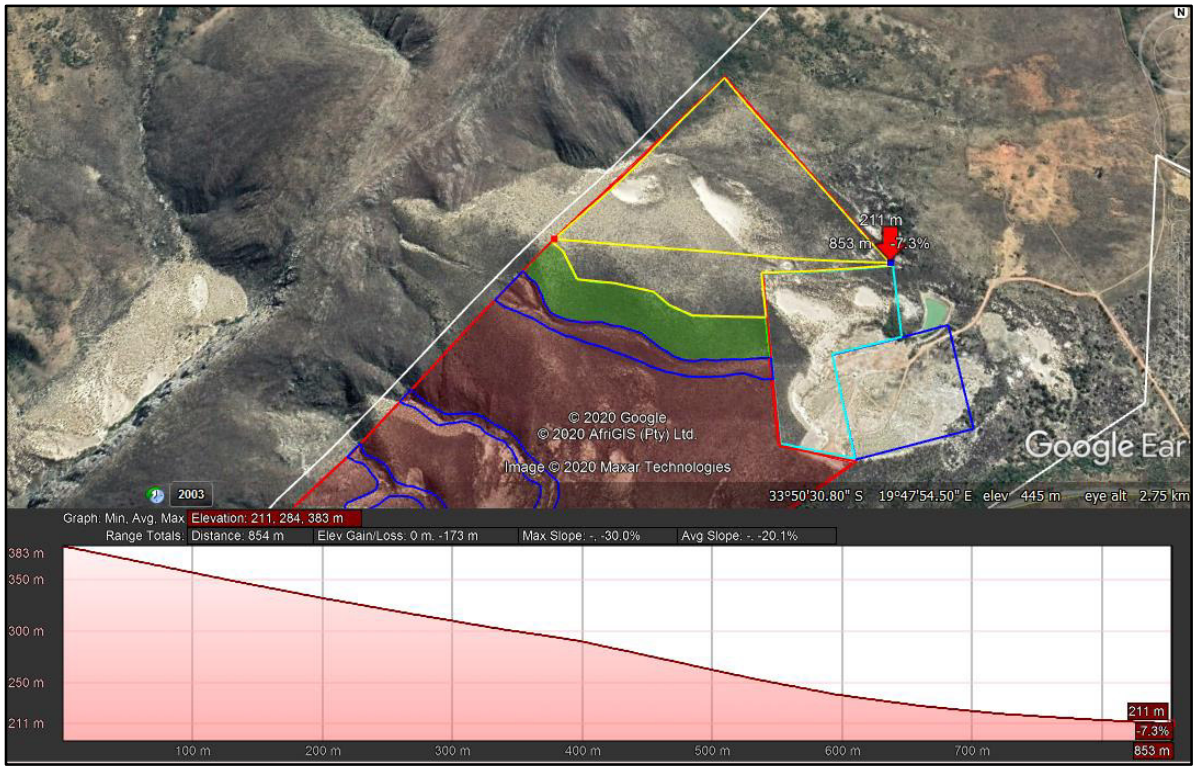


Figure 21: Elevation profile of the area (image obtained from Google Earth).

SITE SPECIFIC VISUAL CHARACTERISTICS

The footprint of S1 is mainly visible from the north-east to the south-west within an approximate area of 3-4 km from the mining area as shown in the image below. Within close proximity the mining area is/will be visible from the neighbouring La Chasseur/Agter-Kliphoogte road.

The figure below shows the viewshed analysis for the S1 (and LA2) footprint within a ±10 km radius. The green shaded areas show the positions from where the mining extension area will be visible. From this analysis it is shown that the visual impact of the proposed extension (S1) will be of high-medium significance without mitigation.

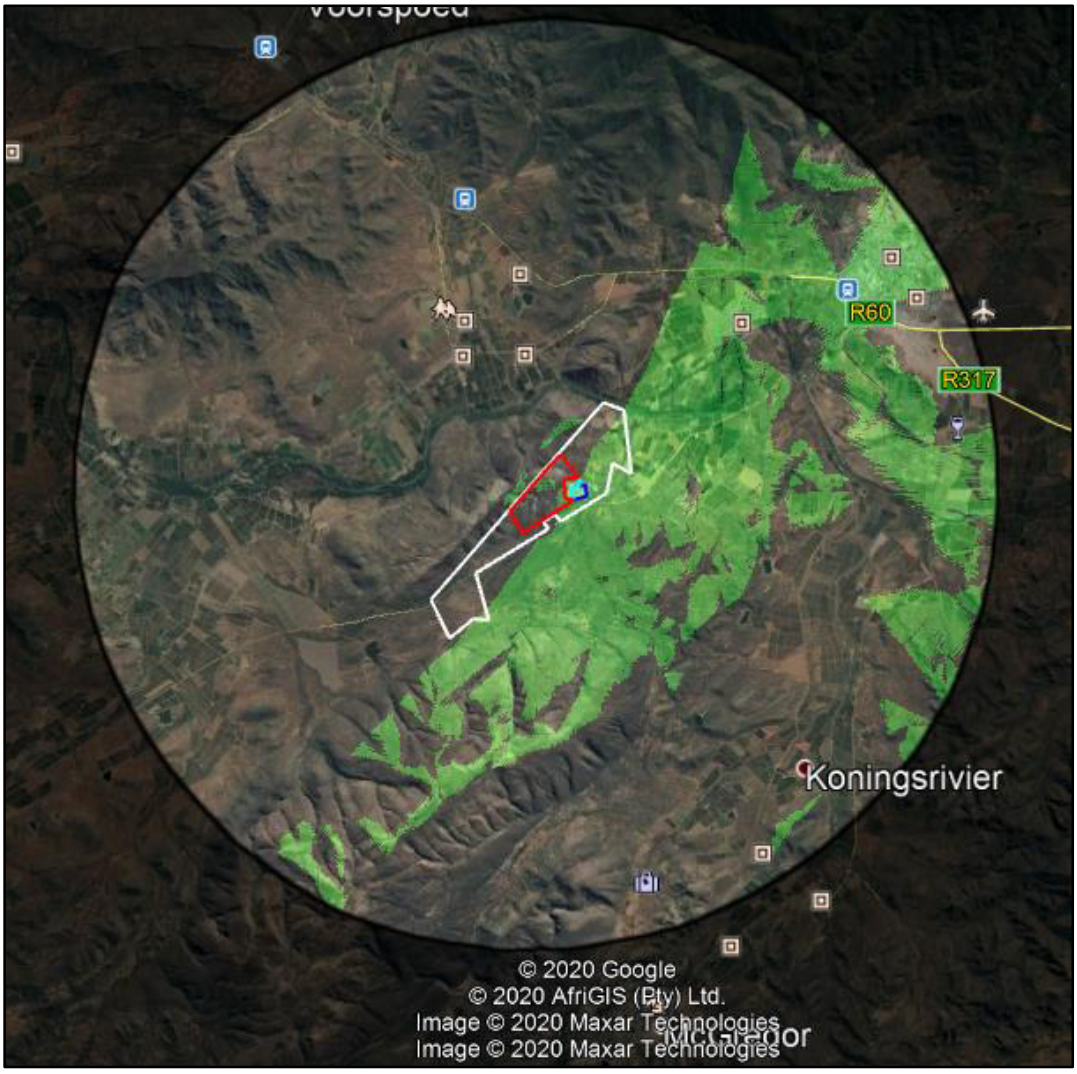


Figure 22: Viewshed analysis of S1 (and LA2) where the green shaded areas show the positions from where the mine will be visible (image obtained from Google Earth).

When the viewshed analysis is drawn for the proposed footprint of LA1, as presented in the figure below, the potential visual impact decreases substantially as the mining operation/effect thereof will be hidden from the south/south-western side of the farm and surrounding environment.

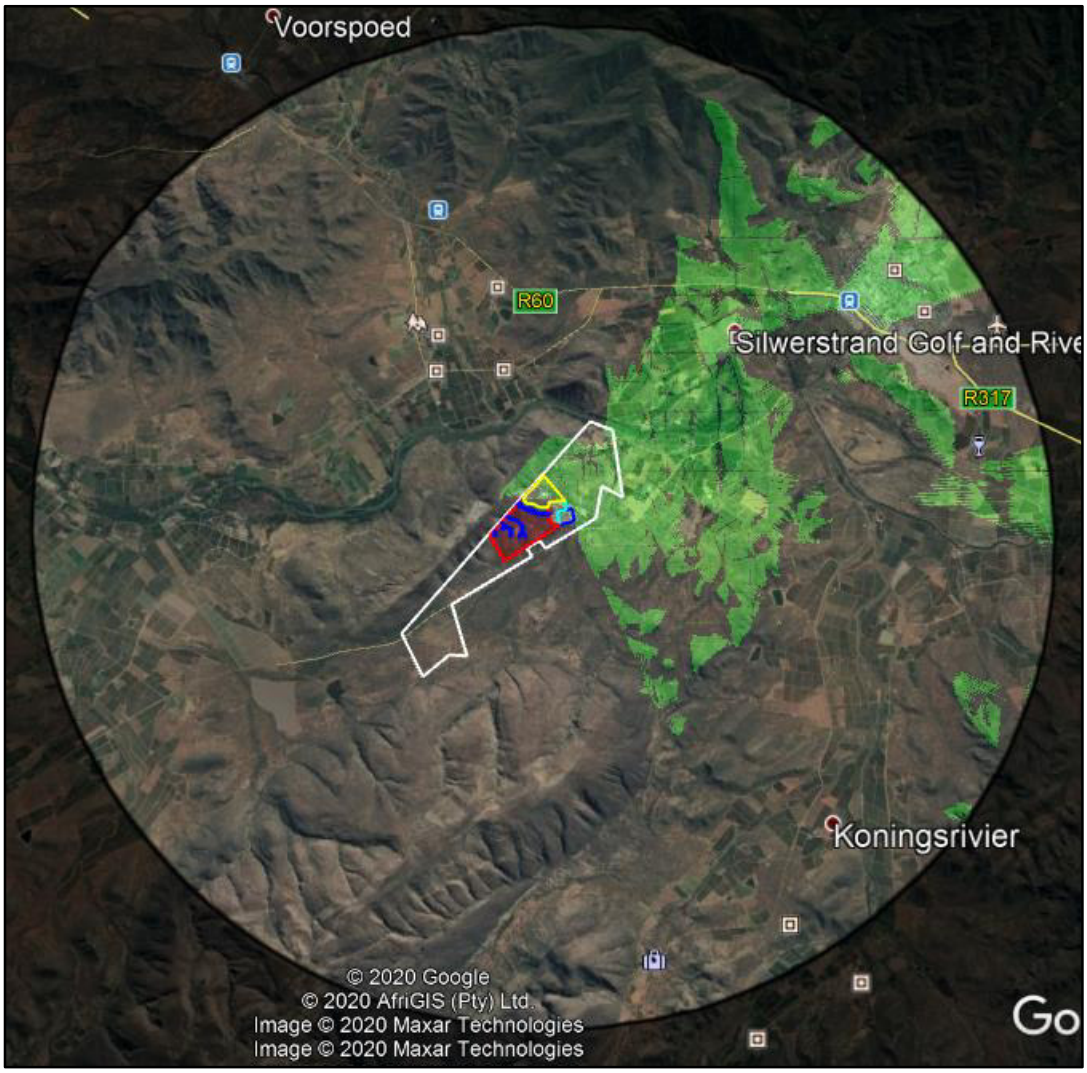


Figure 23: Viewshed analysis of LA1 where the green shaded areas show the positions from where the mine will be visible (image obtained from Google Earth).

The small scale of the proposed operation (±0.5 ha affected at a time), proposed progressive rehabilitation, as well as the fact that no infrastructure will be established further assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine.

SITE SPECIFIC AIR AND NOISE QUALITY

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The Zandberg Sand Mine does not trigger an application in terms of the said act, nor will the proposed extension activity. Emissions generated/to be generated at the mine mainly consist of occasional dust due to the displacement of soil, and transport of the sand from the farm. Due to the small scale

of the operation the noise levels generated at the mine is low and mainly stem from the operation of the FEL and trucks visiting the site.

As mentioned earlier, the mine has to date not received any complaints regarding air or noise nuisance. The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

SITE SPECIFIC GEOLOGY

(Information extracted from the Wetland Delineation Report, 2016 – Appendix G2, and the Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm Zandbergfontein, Robertson, Western Cape – Appendix J)

A dune-like layer of sand, several meters thick, is found against the southern slope of the Zandberg. The sand layer is exposed in certain areas (blow-outs), but mainly covered by natural vegetation along the extend of the mountainside. A layer of pedocrete separates the bedrock from the sand. All of these layers are porous and water moves readily through the sand, while the downward movement is somewhat slowed by the pedocrete.

The HIA confirms the presence of the sand dune and notes that Tyson (1999:3) defines a sand dune as a hill or ridge of sand that has been piled up by the wind. Of the various types of aeolian dunes, the development of one variety is related to topographical barriers such as hills or mountains. These dunes develop where wind-driven migrating sand is obstructed by and accumulates against the windward side of the topographic barrier and can be either sand ramps or climbing (and falling) dunes. Tyson's (1990) study of the dunes on both the northern and southern slopes of the Zandberg concludes that it can be best described as climbing dunes. These develop on steeper inclines than sand ramps and are more mobile than the latter, allowing the migration of sand across the topographical barrier - if the prevailing wind and sand source are sufficient - to form falling dunes on the far side. Based on the topography of the Zandberg and the prevalence of south-easterly winds in the area, the dune in the mine extension area is probably a climbing dune, and those on the opposite side of the mountain are falling dunes that have developed from sand migrating over the ridge.

Climbing dunes tend to be largely homogenous in their composition, and this is the case with the Zandberg dune. The HIA notes that at the time Tyson (1999) carried out her research, the Zandberg mine was already operating and she was able to access a cross section of the dune, which she measured as having accumulated to a depth of

9.3 m above the underlying bedrock. With minor exceptions the sands of this dune are apedal, containing virtually no discernible structure, another characteristic of a climbing dune rather than a sand ramp (Tyson 1999). Tyson (1999:72) obtained three Optically Stimulated Luminescence (OSL) age determinations from the top, middle and base of the Zandberg dune. These indicate that it was actively accumulating at the start of the Holocene (9.9 ± 0.7 thousand years (ka)) and during the period approaching the last glacial maximum (28.8 ± 5.3 ka). The basal date for the dune of 762.7 ± 104.5 ka is well beyond the accepted limit of OSL and is, at best, a maximum age. It indicates, however, that this dune was accumulating at least 350,000 years ago at a time when the area was occupied by Early Stone Age (ESA) hominins.

The HIA notes that with the exception of a handful of large deflation hollows, the Zandberg dune is currently heavily vegetated and largely immobile.

SITE SPECIFIC HYDROLOGY AND GEOHYDROLOGY

(Information extracted from the Environmental Management Programme Report of Zandberg Sand Mine, 2014 as well as the Wetland Delineation for the Extension of the Zandbergfontein Sand Mining Operation, 2016)

The EMPR of the mine notes that water is in evidence as a leachate at the tow of the dune. This is due to a perched water table caught in the sand overlaying the sandstone formation of the area. The seepage naturally occurs all along the foot of the dune with a clearly defined water course (drainage line) in evidence (opposite the road). According to the EMPR, the sand dune is classified as an unconfined phreatic aquifer located above the regionally extensive aquifer. A feature of phreatic aquifers is that they release large quantities of water by drainage through the pores of the aquifer. In this case the border of the sand dune. Because there is no aquitard confining the water, this drainage typical continues up to the drainable porosity of the aquifer material. The visible effect of drainage is more pronounced in the winter rainy season. No evidence was found that there is a cone of depression in the groundwater formed by the mining activities, normally visible through vegetation distress (or failing of boreholes).

In 2016, the MR Holder applied for water use authorisation for activities that trigger Section 21 (c) and 21(i) of the NWA, 1998. The application was accompanied by a Wetland Delineation Report conducted by WATSAN Africa in 2016. The wetland report had to verify the presence or absence of a wetland within the potential mining area, as well as determine whether the wetland against the lower slope of the Zandberg mountain is indeed a valid wetland in need of protection or whether it has been artificially induced by the mining activities with little if any conservation status. The report stated that the layer of sand and underlying sandstone of the Zandberg stores

groundwater that eventually migrates into the aquifer in the valley below. There is a drainage line south of the Zandberg (see figure below) in the valley that is mostly dry and only contains water when it rains. This line connects to the Breede River.

The wetland report also confirmed that groundwater is emitted at the foot of the body of sand up against the slope of the Zandberg. The pedocrete here is exposed and the water moving through the sand is partially intercepted prior to penetrating the sandstone. Hence a fountain is formed all along the base of the sand dune, as the water surfaces at this interface. It is uncertain if the pedocrete was exposed prior to the onset of mining and if there was a seep at the location. At this very interface, at the foot of the sand dune up the slope of the mountain, a trench of a metre deep was dug to intercept more of the groundwater, not only the part that surfaced, but also more of it that found its way lower down into the sandstone. The trench stretches all the way to the dam on the property (east of the proposed extension area) and the volume of water in the dam bears testimony of a strong supply of groundwater. Ground water surfaced below the trench at various places showing that only a portion of the ground water actually ends up in the dam. The removal of the sand layer in this part of the mined out area contributed to the decanting of groundwater. The sand here is now much thinner and the remaining sand cannot hold the original volume of water. Hence it decants rather than entering the semi-saturated sandstone below. The end result is that more water evaporates and less ends up in the aquifer. This is not unique either, as a number of sand mines that WATSAN investigated in the Western Cape result in very much the same ill effect. However, the affected area at Zandberg is small and it is surmised that the effect on the entire aquifer will hardly be noticed.

The soil adjacent and downhill from the trench was noticeably wet during the field visit (2016). In some places water was emitted from the ground. If wetness was to be the sole indicator, this surely could be classified as a wetland. However, these wetland conditions may well be because of the mining, with the removal of sand and subsequent reduced water holding capacity and do not seem to be a natural or historic situation. The specialist did not find any evidence of gleying or blotching of soils that would classify the area as a wetland. The study concluded that the wet area is an anthropologically induced wetland that could perhaps be classified as “incidental” rather than “artificial”. It bears no special or any other conservation status. Because the landscape has been changed as a result of mining, it did not seem feasible to classify the Zandberg fontein Wetland. If it was nevertheless to be classified, the specialist named it a foot slope seep against a lower mountain side without a discernible channel. The trench is artificial and is nothing that resembles a natural

channel. The area of the mine does not have any connectivity with the drainage line in the valley below. The trench will most likely be destroyed while mining the sand dune against the mountain slope. Once the area has been mined out the trench will probably be restored in order to assure a flow of water from the remaining seep into the dam. The report stated that since the trench is entirely artificial with an insignificant conservation status it is of no concern at all and therefore recommended that the mining (approved mining area) should go ahead.

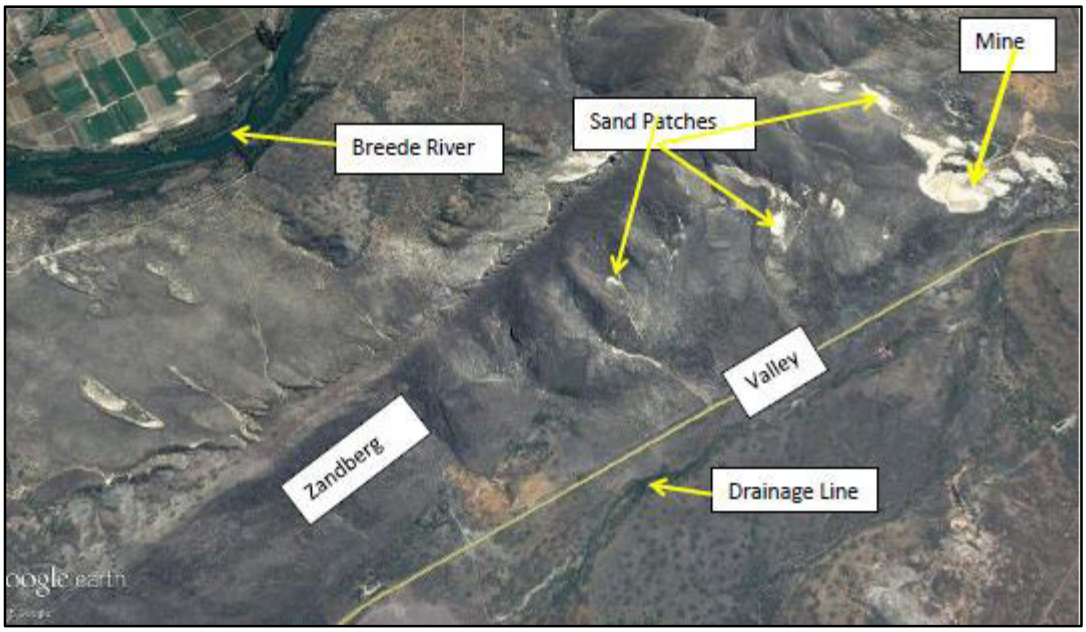


Figure 24: Image obtained from the Wetland Delineation Report that shows the drainage line on the opposite side of the La Chasseur/Agter-Kliphoogte road (WATSAN Africa, 2016)..

In April 2018, the general authorisation of Zandberg Sandput (Pty) Ltd was approved and water use certification 29005996 was issued for Section 21 (c) and (i) (NWA) activities.

If the above discussion regarding groundwater is applied to the proposed extension of the mining area (as proposed by LA1), it is noted that the water table, in the valley below the mining area (±197 masl), is ±3 m below ground level. The topography of the proposed S102 extension area rises up the hill to a maximum height of 383 masl in the north-western corner (LA1) and 267 masl in the northern corner (LA1). The lowest point of the proposed extension area is at 211 masl in the eastern corner (LA1). Therefore, there is a rise in the topography of at least 14 m between the lower laying valley and the proposed mining area (lowest point).

The MR Holder proposes to mine the sand resource up to the underlying sandstone layer that gradually inclines up the hill. The sandstone layer will be the limiting depth of the proposed mining activity, and no mining will be allowed into/below it. In order to

avoid impacting on infiltration, groundwater recharge and flow, the Department of Water and Sanitation (DWS) generally stipulates that sand mining not be allowed within 1.5 m of the groundwater level. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from the proposed extension area will intercept (or come within 1.5 m) the groundwater layer if the mining depth is limited to the underlying sandstone layer.

SITE SPECIFIC MINING AND BIODIVERSITY CONSERVATION AREAS

(Refer to the Botanical Study and Assessment for the Sand Mine near Robertson, Western Cape Province – April 2020 attached as Appendix I2)

Following the earlier discussion in this regard; when the footprint of S1 is layered over the Mining and Biodiversity Guideline Map it falls over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline notes that EIA's and specialists should focus on confirming the presence and significance of these biodiversity features, identifying features not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy. The area of highest biodiversity importance also corresponds with the Langeberg CBA as identified in the 2017 Western Cape Biodiversity Spatial Plan.

As mentioned earlier, the proposed extension of the mining area will not have an impact on the national ecosystem-specific protected area targets. It was however noted that the proposed development will result in the local loss of some functions and services of the ecosystem. However, the area that will be transformed will only cover 2.92% of the total area of this sand plume. Furthermore, when taking into account the total combined size of all such dune plumes and dune seas that are covered by the Breede Sand Fynbos Vegetation Type / Ecosystem an area of less than 1% (0.19% of 9277 ha) of this vegetation type / ecosystem will be impacted. Subsequently it is unlikely that this development will influence the status of this vegetation type / ecosystem.

The BSA notes that ecosystems consist of a mosaic of many different patches. The size of natural patches affects the number, type, and abundance of species they contain. At the periphery of patches, influences of neighbouring patches become apparent, known as the 'edge effect'. Edges seldom contain species that are rare, habitat specialists or species that require larger tracts of undisturbed core habitat. Fragmentation due to development reduces core habitat and greatly extends edge habitat, which causes a shift in the species composition, which in turn puts great pressure on the dynamics and functionality of ecosystems (Perlman & Milder 2005).

Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of development be kept as close together as possible.

The botanist concluded that if the entire proposed extension footprint of 108.3851 ha is approved for mining it is highly likely that this development will contribute to the following cumulative impacts of the area:

- Affecting the conservation targets set out by the province for this region;
- Impact the conservation targets set out for the vegetation type and ecosystem (at national level).
- Compromise the ecological functioning of the larger "natural" environment; and
- Disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

However, a loss of only the 30% (of the preferred layout footprint (LA1)) located to the north will not contribute to the cumulative impacts as described above and as such this area was regarded as acceptable for the development by the specialist.

SITE SPECIFIC VEGETATION

(Refer to the Botanical Study and Assessment for the Sand Mine near Robertson, Western Cape Province – April 2020 attached as Appendix I2)

The BSA reports that the vegetation of the study site resembles pristine forms of Breede Sand Fynbos throughout the majority of the site, together with pristine North Sonderend Sandstone Fynbos in the Western and south-western corner, adjacent to drainage lines (Figure 26). In terms of Breede Sand Fynbos, there was some variability in habitat types (Figure 25), mostly related to vegetation cover, for example the existence of mobile dunes with sparse vegetation cover, progressing towards semi-mobile dunes with moderate cover, to stabilised sands/dunes with high vegetation cover.

The majority of the vegetation was relatively uniform. The tall shrub layer had Proteaceae species alternating in dominance, such as *Protea laurifolia, Leucospermum calligerum, and Leucadendron salignum*, together with scattered individuals of *Wiborgia obcordata.* The medium to small shrub layer was dominated by *Aspalathus lactea, A. quinquefolia*, and *Euchaetis pungens*. Although the site was relatively absent of forb species, smaller shrubs and plants that were abundant included *Aristea dichotoma, Prismatocarpus brevilobus*, *Wahlenbergia nodosa*, and *Polpoda capensis*. Finally, the graminoid layer was dominated by *Thamnochortus*

lucens and *Willdenowia incurvata,* with less dominant *Pentameris pallida* and *Stipagrostis zeyheri*. The vegetation unit in its entirety was pristine, with no signs of previous transformation or secondary vegetation. Also, no invasive alien plant species were observed.

In terms of North Sonderend Sandstone Fynbos, the extent of the vegetation unit was less than what has been mapped according to the Vegetation Map of South Africa (Mucina & Rutherford 2006). This is to be expected, since the latter represents mapping conducted at coarse spatial scales. The true extent of the North Sonderend Sandstone Fynbos vegetation unit was limited to a south-western slope adjacent to a drainage line in the western part of the site, together with the slopes of the south-western corner of the site, which is characterised by an increased elevation. The vegetation type is thus confined to the steep mountainous slopes bordering the proposed mining area, and that intrudes partly into the site in the western and south-western sections. The tall shrub layer again included species from the Proteaceae, such as *Protea laurifolium* and *Leucadendron salignum*, together with *Serruria gremialis*, and the rock-loving species *Maytenus oleoides* was observed growing in between many of the exposed sandstone crevices. A few scattered individuals of *P. nitida* were observed, although they were not within the boundaries of the site. The medium height shrub layer was dominated by *Aspalathus burchelliana* and *A. hirta*. The graminoid layer was dominated by the grass *Capeochloa cincta*. The vegetation bordering the drainage lines was mostly similar to that of the North Sonderend Sandstone Fynbos vegetation, i.e. being mostly characterised by *A. burchelliana* and *A. hirta*, *S. gremialis*, *Maytenus oleoides*, and *C. cincta*, but also included *Podalyria rotundifolia* and *Cliffortia ruscifolia* as semi co-dominants.

In terms of ecological sensitivity and conservation value / importance, the pristine nature of the vegetation (no invasive aliens, no transformation, no secondary vegetation), the numerous unique micro-habitats present, and the various important functions and services provided by these habitats and their vegetation cover, as well as the fact that the majority of the area is located within a CBA1, regarded as important for meeting the provincial conservation targets, means that the entire site can be classified as highly sensitive (Figure 27). However, the northern section of the site can be regarded as acceptable loss to the development as this area (north of the prominent drainage line) covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. Subsequently this area is largely a uniform habitat type, and development within this section will not impact the status of the vegetation / ecosystem type, red data species or influence the conservation targets set out for this CBA1 area.

Furthermore, by restricting mining activities to this area adjacent to the existing mining area, potential impacts are “compressed” in a confined area avoiding further habitat fracturing as well as influencing important biological corridors.

Due to high habitat (micro-habitat), fine scale vegetation pattern and plant species turnover associated with the southern half of the project site as well as the functions and services associated with some of these habitat type, it is recommended that this southern portion is excluded from the proposed mining footprint. Also, this area is regarded as an important portion of the CBA1. All drainage lines are regarded as high sensitivity, No-Go features.

The northern portion of the dune plume regarded as acceptable for the proposed activity covers approximately 30% of the original extent that is being proposed. The remaining area should be set aside to function as a biodiversity offset area.

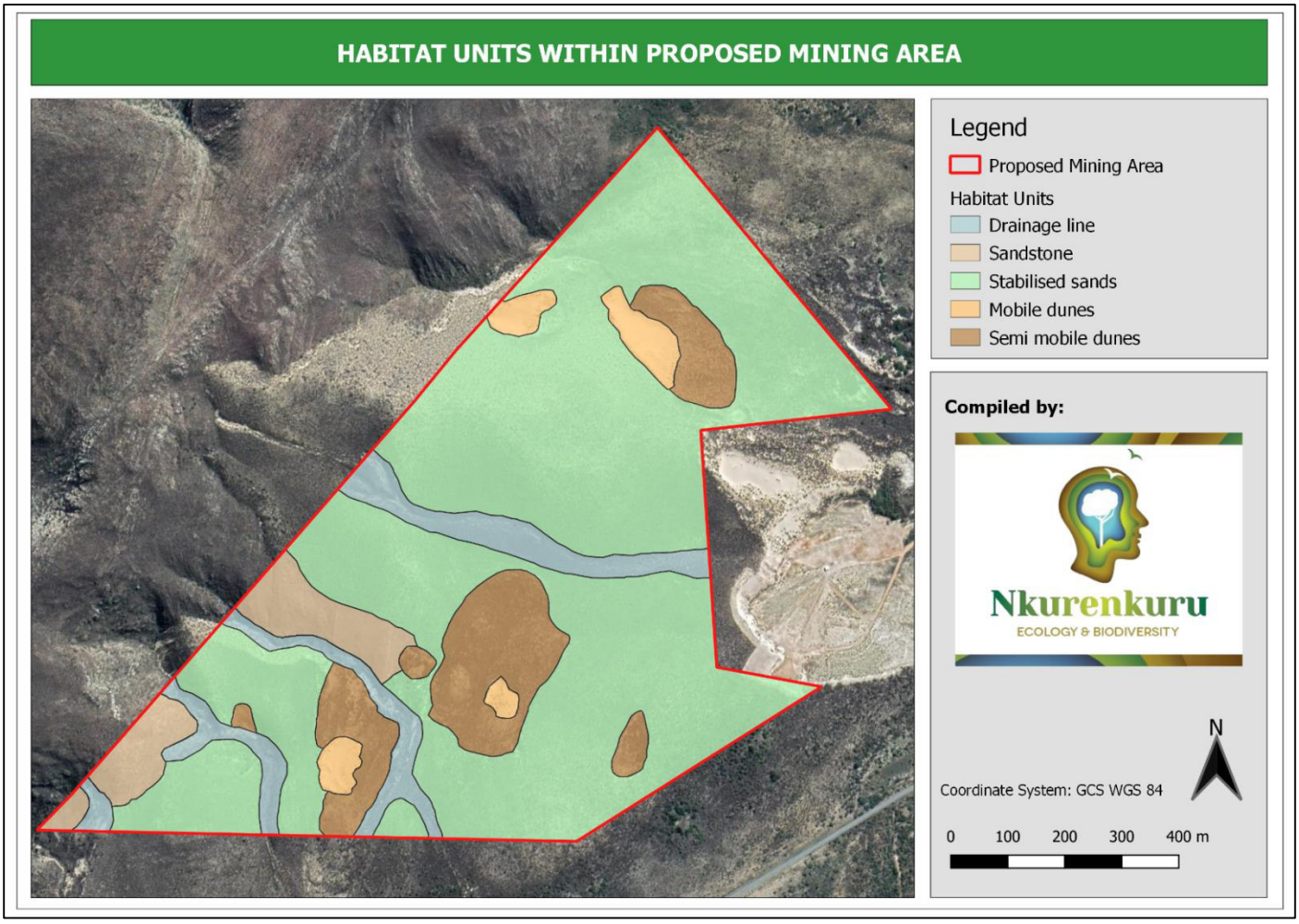


Figure 25: Map illustrating the habitat units identified within the survey site.

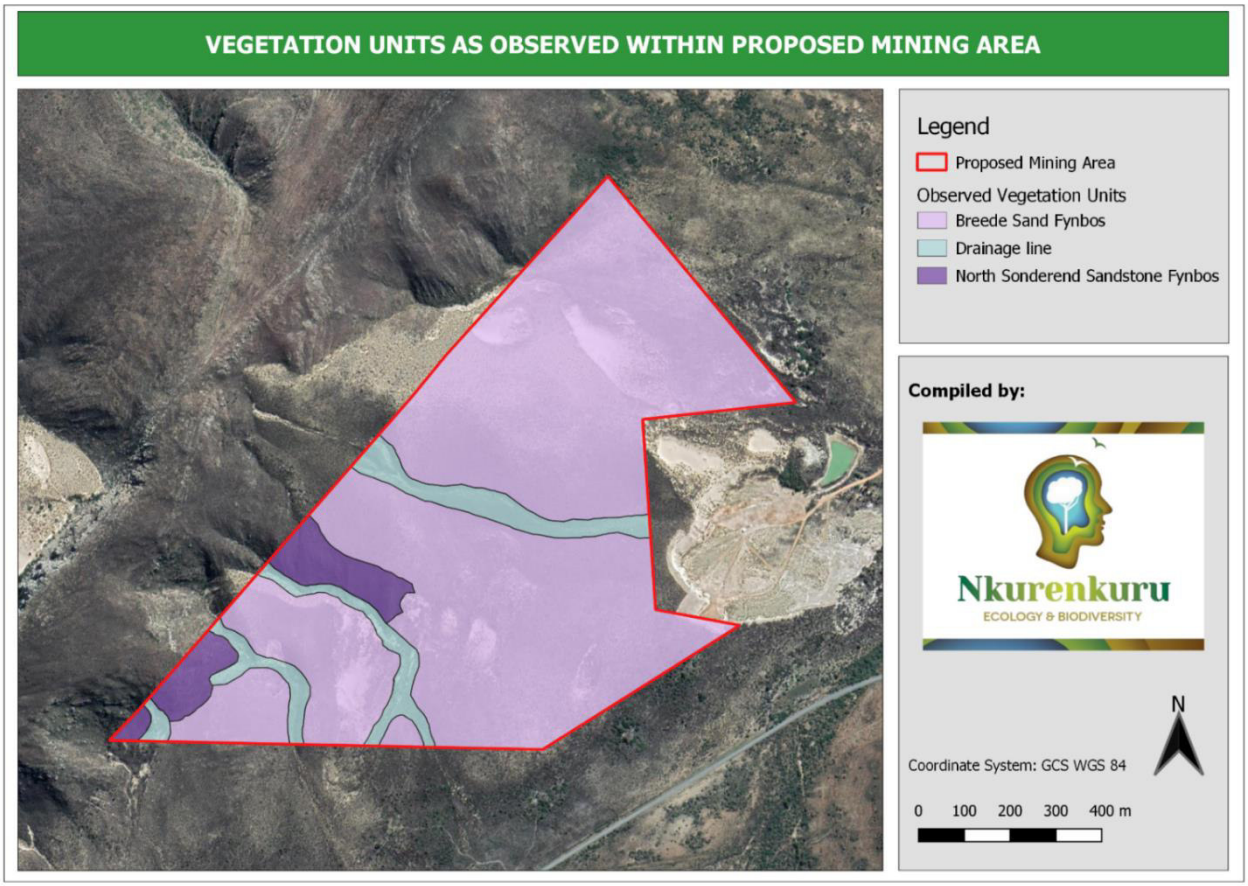


Figure 26: Map illustrating the ground truth (actual) extent of the vegetation types within the proposed mining area.

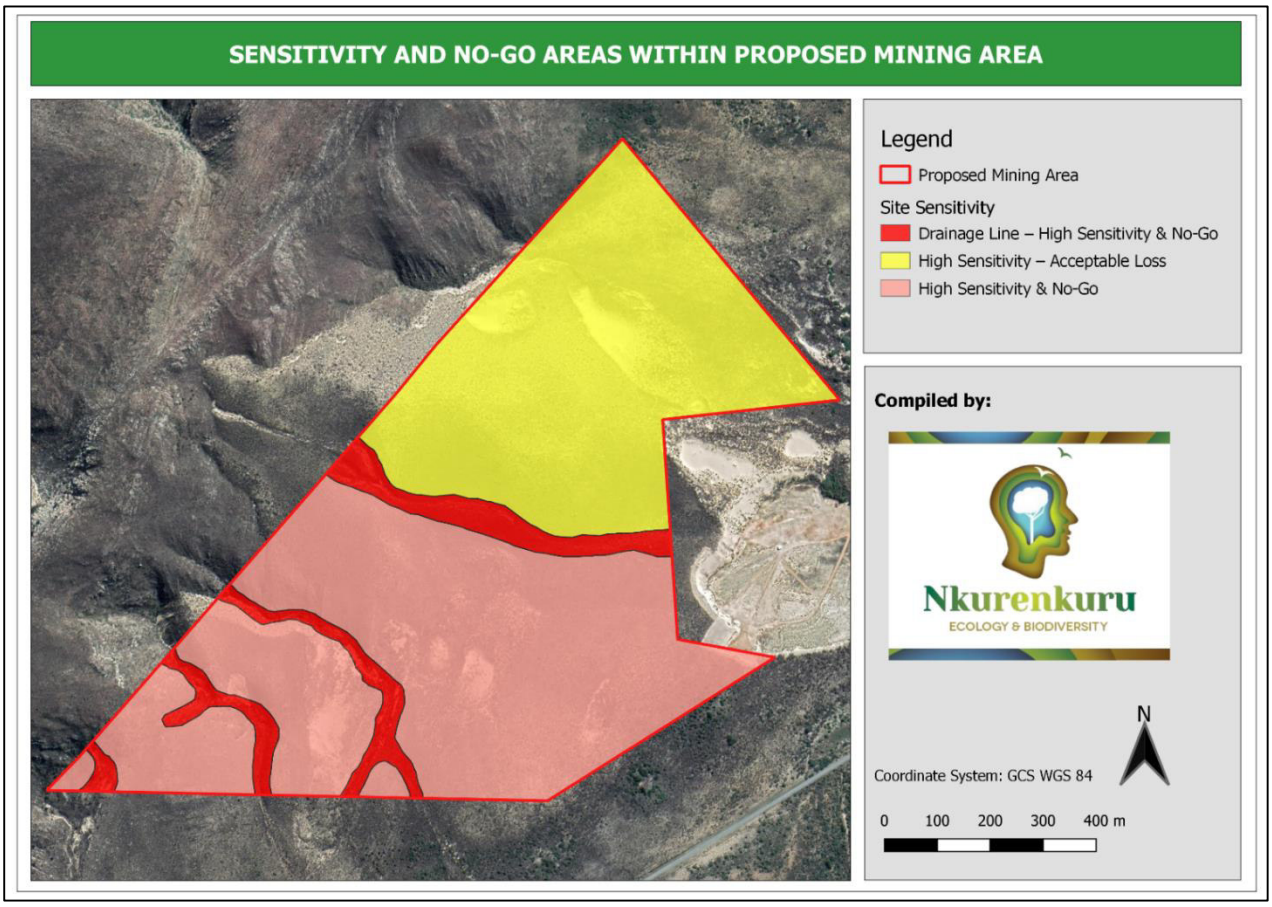


Figure 27: Map illustrating the ecological sensitivity of the project site.

Species of Conservation Significance:

Ground truthing confirmed a total of seven (7) Species of Conservation Concern to be present on site, five (5) of which are Threated Species (listed below). Furthermore, two of these species, namely *Aspalathus burchelliana* (EN) and *Lachnaea uniflora* (VU), were not present in the list obtained online (POSA) during the desktop phase, which proves the value of ground-truthing sites to validate such online species lists. Furthermore, a total of twelve (12) provincially protected (Schedule 4) floral species have been recorded within the project site.

Table 14: Conservation Important Flora Species recorded within the surveyed site.

Family	Species	Conservation Status	
		IUCN Red List	WCNCO (Schedule 4)
Fabaceae	*Aspalathus burchelliana*	EN	
Aizoaceae	*Stayneria neilii*	VU	
Fabaceae	*Aspalathus lactea*	VU	
Rutaceae	*Euchaetis pungens*	VU	Protected
Thymelaeaceae	*Lachnaea uniflora*	VU	
Asteraceae	*Metalasia adunca*	NT	
Aizoaceae	*Ruschia pungens*	DD	
Asphodelaceae	*Aloe perfoliata*	LC	Protected
Ericaceae	*Erica imbricata*	LC	Protected
Ericaceae	*Erica similis*	LC	Protected
Ericaceae	*Erica sonderiana*	LC	Protected
Iridaceae	*Aristea dichotoma*	LC	Protected
Proteaceae	*Leucadendron salignum*	LC	Protected
Proteaceae	*Leucospermum calligerum*	LC	Protected
Proteaceae	*Paranomus dispersus*	LC	Protected
Proteaceae	*Protea laurifolia*	LC	Protected
Proteaceae	*Serruria gremialis*	LC	Protected
Rutaceae	*Agathosma stipitata*	LC	Protected

NB: Although the maps of the BSA omits the most southern corner of the proposed S102 extension area, the entire ±108 ha area were assessed during the site inspection. The numbers and percentages used in the report are also consistent with the proposed ±108 ha footprint.

SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm Zandbergfontein, Robertson, Western Cape – Appendix J)

Archaeological Assessment:

The HIA notes that although Later Stone Age (LSA) sites and materials are to be expected in the Breede River valley, the desktop study did not find record of such archaeological material. Similarly, although historical records confirm that the Breede River valley was visited by Khoekhoen pastoralist groups during the 18th century, their settlements have not been traced. Deacon (2007:2) notes that the gravels of the Breede River are associated with ESA artefacts, with reports of these artefacts being widely encountered in the plough zones of vineyards in the area. The presence of ESA artefacts, has been confirmed by various HIA and/or NID studies in the surrounding areas.

During the site survey, the specialist found no evidence of archaeological sites or material on the surface of the earmarked dune. Deflation hollows often contain archaeological material – the result both of people in the past making use of the shelter these hollows provide and the exposure of previously buried archaeological material as the hollow develops. A number of the deflation hollows within the mine expansion area were visited but even in instances where it had deflated to the level of the gravel underlying the dune sand no archaeological material was noted in any of the hollows.

Given the documented and widespread occurrence of ESA and MSA artefacts in the region, it is possible that archaeological material is present on or in earlier soils under the dune sand in the mine expansion area on Zandberg fontein. The apparent age of the dune – in excess of 200,000 years according to the OSL age determinations obtained by Tyson (1999) – suggests that if such material is present on the underlying slope, it is likely to consist of ESA lithics, as the dune would already have been present and developing during most or all of the MSA.

The specialist did not find any historic buildings or structures, cemeteries or graves within the surveyed area.

Palaeontological Assessment:

According to the desktop palaeontological assessment conducted by Dr Bamford the bedrock in this area is part of the Cape Supergroup, composed of siliciclastic sediments deposited in a passive margin basin with strata that are up to 10 km deep and spanning about 170 million years of earth history between the Early Ordovician

circa 500 million years ago (Ma) and the Early Carboniferous circa 330 Ma. Although the subsequent Cape Orogeny has deformed these strata, there is lateral continuity in the Western Cape of over 1000 km of the three subdivisions of this group of sediments (Thamm and Johnson, 2006).

The lowest and oldest group is the Table Mountain Group, with sediments dating from the Ordovician, Silurian and Devonian periods. The middle, Devonian, Bokkeveld Group is divided into two subgroups: the lower Ceres Subgroup and the upper Bidouw Subgroup. The youngest Cape Supergroup sediments are the Witteberg Group, with two subgroups in the Western Cape: the Weltevrede and Lake Mentz Subgroups (Thamm and Johnson, 2006).

The Table Mountain Group is a typical cratonic sheet sandstone and is represented in the wider project area by only the uppermost Rietvlei Formation that is a shallow marine sandstone. The Bokkeveld Group is represented here by three formations in the Ceres Subgroup and two from the Bidouw Subgroup, particularly the Wupperthal Formation, indicating a cyclic alternation of fine-grained sandstone (delta front) and mudrock (offshore shelf) units (Thamm and Johnson, 2006). Unconformable overlying the Cape Supergroup rocks are the much younger, mainly Quaternary aeolian sands and dunes that characterise the mine expansion area and which were described above.

A refined study of the SAHRIS palaeo-sensitivity map (see figure below) indicates that the bulk of the mine expansion area is of low palaeontological sensitivity (blue) and this applies to the Tertiary-Quaternary aeolian sands, grit and scree. There is a small chance that marine fossils might have been entrapped in these aeolian sands that were derived from older sandstones but because of the transported and abrasive nature of the sands, any fossils will have been highly fragmented and no longer recognisable (Roberts et al., 2006). From photographs taken during the site survey the sands are very uniform in colour and texture, with no indication of inclusions of different material, so it is very unlikely that they have preserved fossils.

Along the north-western margin of the mine expansion area, on the upper slopes of the Sandberg, the palaeo-sensitivity map indicates the presence of a narrow band of high sensitivity (brown). According to the palaeontological assessment this is an outcrop of Bokkeveld Group Wupperthal Formation which is composed of micaceous sandstones and siltstones and could contain marine or near shore fossils such as brachiopods, bivalves and other marine shells (Penn-Clarke et al., 2018).

Where this rock is exposed on the surface there will be no impact from mining operations due to the absence of the target resource. Where it is covered by the dune, mining will cease at the sand/bedrock interface and any potential impacts will be minimal.

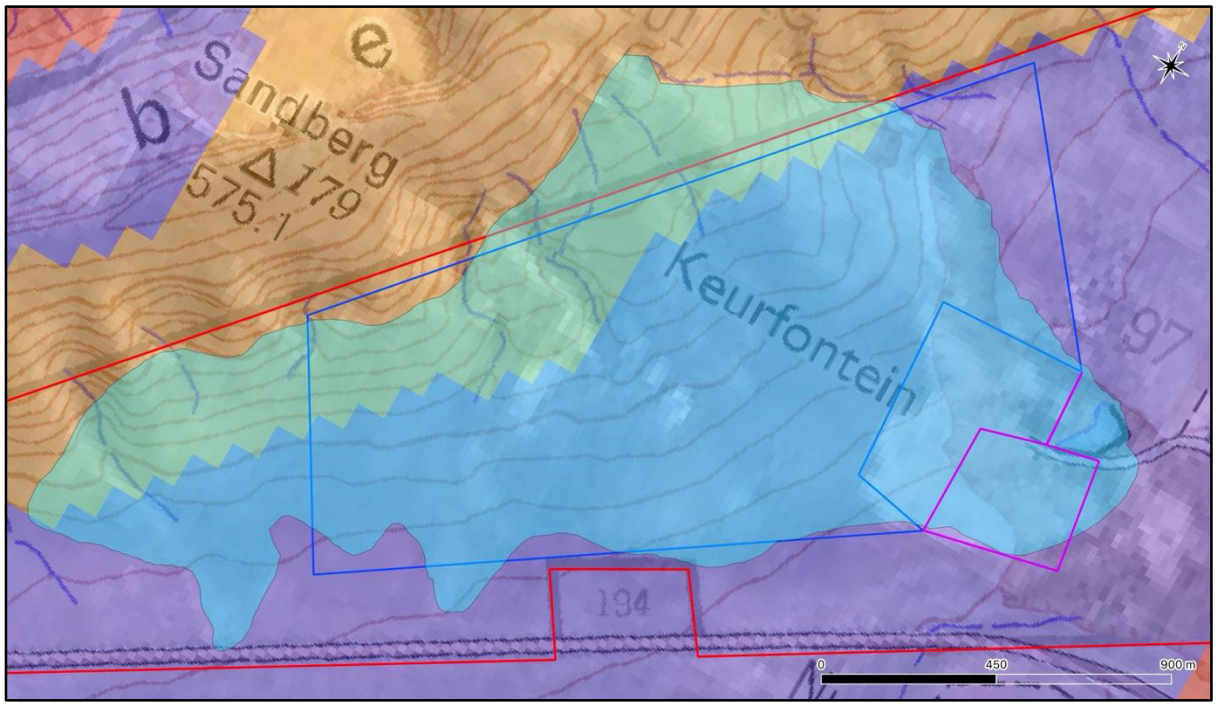


Figure 28: Overlay of mine extension area (blue polygon) on the SAHRIS palaeo-sensitivity map of the site. The background colours indicate the following degrees of sensitivity: brown = high and blue = low and the approximate extent of the sand dune on the site is shaded blue (Source: https://sahris.sahra.org.za/map/palaeo & HIA).

Conclusion:

The HIA found that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA (and incorporated into the DEIAR) are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

SITE SPECIFIC SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Social and Labour Plan of Zandberg Sandput (Pty) Ltd attached as Appendix O)

A Social and Labour Plan (SLP) was submitted as part of the S102 amendment application of the MR holder. 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 Robertson area. It offers the building blocks for future economic development and growth of the local area. The scope of the document offers the MR holder 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 following was extracted from the SLP of the mine, highlighting some of the commitments of the mine towards improving the socio-economic status of the receiving environment.

Human Resource Development Programme:

As this report forms part of a S102 amendment application to expand the current mining footprint, the number of employees will not increase, and the operation will still remain very small and consequently will not have the capacity or structure to be comparative in terms of Training and Development and Social Responsibilities, to that of other larger mining operations. Although training initiatives are somewhat restricted due to the size and financial constraints of the operation, the company has fully embraced the concept of sectoral training and has access to the activities of SETA (Sector Education and Training Authority) and MQA (Mining Qualifications Authority). The mine will continue to pay the skills development levies of all its employees to the South African Receiver of Revenue as a legal requirement. The objectives of the skills development plans for Zandberg Sand Mine are as follows:

- Ensure that all employees have the ongoing skills required for successful continuation of the mining operations (workplace skills).
- To implement plans to ensure succession of management and career development is achieved through the identification of talent and development of the identified talent.
- Develop plans to provide all employees with both life skills and portable skills that they may need either upon closure of the mine or should they choose to leave the employment of the mine.
- Provide ABET training to ensure all employees have the opportunity to obtain an education level up to ABET 4.

Zandberg Sand Mine intends to implement regular awareness programs to inform all employees of the benefits of good nutrition, balanced diets, correct method of food preparation to maximize nutritional benefits of food as well as Water and Sanitation when preparing food, including the use of nutritional diets in the

management of HIV/Aids and Tuberculosis. Zandberg Sand Mine will provide employee transport to and from the site at no cost to the employee. The employees will also undergo annual medical check-ups, at the expense of Zandberg Sand Mine.

Local Economic Development Plan (LED):

The LED project allocated to Zandberg Sandput (Pty) Ltd and approved by the municipality is the installation of block paving/cement slabs at the Willem Buchaltz School, La Chasseur Robertson, which is a small local farming school and therefore does not have many financial resources. The area allocated for this project is 260 m² that will be implemented in two phases. This project is sustainable in that no upkeep will be necessary by Willem Buchaltz school after implementation and finalisation of the project. This project will lead to upliftment of the local school on scholars, in that the area surrounding the school will no longer be muddy during rainy weather, nor dusty during windy/dry weather.

SITE SPECIFIC EXISTING INFRASTRUCTURE

Apart from the power line that follows the La Chasseur/Agter-Kliphoogte road just inside the farm boundary, no other infrastructure has been established on the property that can be affected by the proposed extension development.

(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).

As the Zandberg Sand Mine has been operational for the past 26 years, the impacts associated with the approved mining area were listed under *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*.

For the proposed S102 extension area the following potential impacts were identified for each main activity in each phase. 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, therefore the worst-case scenario and should be seen as a preliminary assessment. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

STRIPPING AND STOCKPILING OF TOPSOIL

Alteration of the agricultural sense of place

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	5	4	**10.4**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	3	5	4	**12**

Loss of agricultural land for duration of mining

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
1	5	1	2	5	5	5	**10**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.3	5	5	5	**11.5**

Visual intrusion as a result of mining

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**
Rating: Medium-High			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
2	5	3	3.3	5	5	5	**16.5**

Potential impact on vegetation and listed and protected plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
4	5	1	3.3	5	2	3.5	**11.6**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
5	5	1	3.6	5	2	3.5	**12.6**

Potential impact on the CBA1 area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Full**		
4	5	1	3.3	3	2	2.5	**8.3**

Rating: Medium-High			Layout Alternative 2			Degree of Mitigation: No Mitigation	
5	5	5	5	5	2	3.5	**17.5**

Loss of topsoil and fertility during mining and stockpiling

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

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

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	2	3	**12.9**
Rating: Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	2	3	**12.9**

Potential impact on local fauna due to disturbance and loss of available habitat and migration routes

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Partial**	
3	4	3	3.3	3	5	4	**13.2**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: Partial**	
4	4	3	3.6	4	5	4.5	**16.2**

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

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

Potential impact on archaeological artefacts

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**

Potential impact on the drainage lines/watercourses within the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
5	5	3	4.3	2	1	1.5	**6.5**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: Full**	
5	5	3	4.3	4	3	3.5	**15**

Potential increased erosion risk and destabilisation of the dune plume

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
5	4	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
5	4	1	2.6	4	5	4.5	**11.7**

EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

Visual intrusion associated with the extraction of the mineral

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Layout Alternative 1**			**Degree of Mitigation: Partial**	
2	5	2	3	5	5	5	**15**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: Partial**	
2	5	3	3.3	5	5	5	**16.5**

Creating steep slopes and uneven surfaces

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
3	4	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
3	4	1	2.6	4	5	4.5	**11.7**

Soil contamination from hydrocarbon spills

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
4	5	1	3.3	3	2	2.5	**8.3**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
4	5	1	3.3	3	2	2.5	**8.3**

Disturbance to fauna within the footprint area

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

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Partial**	
2	4	2	2.7	2	5	3.5	**9.5**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Partial**	
2	4	2	2.7	2	5	3.5	**9.5**

Potential impact associated with littering at the mining area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
3	5	2	3.3	3	3	3	**9.9**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
3	5	2	3.3	3	3	3	**9.9**

Potential impact on areas of palaeontological concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**

Facilitation of erosion

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
5	4	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
5	4	1	2.6	4	5	4.5	**11.7**

TRANSPORTING OF MINERAL

Dust nuisance caused by vehicles transporting the mineral

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

Degradation of the access road

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
2	5	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Site Alternative 2**			**Degree of Mitigation: Full**	
2	5	1	2.6	4	5	4.5	**11.7**

Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
2	5	2	3	3	1	2	**6**
Rating: Low-Medium			**Site Alternative 2**			**Degree of Mitigation: Full**	
2	5	2	3	3	1	2	**6**

Reduced ability to meet conservation obligations and targets

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
1	5	2	2.6	2	5	3.5	**9.1**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: No Mitigation**	
2	5	5	4	4	5	4.5	**18**
Rating: Medium-High			**Layout Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	
2	5	5	4	3	5	4	**16**
Rating: High			**Layout Alternative 2 with other projects in the area**			**Degree of Mitigation: No Mitigation**	
4	5	5	4.6	4	5	4.5	**20.7**

Impact the broad-scale ecological processes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
1	5	2	2.6	2	5	3.5	**9.1**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: No Mitigation**	
2	5	5	4	4	5	4.5	**18**
Rating: Medium-High			**Layout Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	
2	5	5	4	3	5	4	**16**
Rating: High			**Layout Alternative 2 with other projects in the area**			**Degree of Mitigation: No Mitigation**	
4	5	5	4.6	4	5	4.5	**20.7**

Cumulative impact of projects on palaeontological resources

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Layout Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Layout Alternative 2 with other projects in the area**			**Degree of Mitigation: Full**	
5	5	4	4.6	2	1	1.5	**6.9**

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

Erosion of returned topsoil after rehabilitation

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

Infestation of the reinstated area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	2	3	**12.9**
Rating: Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	2	3	**12.9**

Potential impact associated with litter left at the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
3	5	2	3.3	3	3	3	**9.9**
Rating: Low-Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
3	5	2	3.3	3	3	3	**9.9**

Uneven surfaces or steep slopes left upon closure of the site

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
3	4	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Layout Alternative 2**			**Degree of Mitigation: Full**	
3	4	1	2.6	4	5	4.5	**11.7**

Return of the mining area to agricultural use upon closure **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**			**Degree of Mitigation: N/A**	
1	5	5	3.7	5	5	5	**18.5**
Rating: Medium-High			**Site Alternative 2**			**Degree of Mitigation: N/A**	
1	5	5	3.7	5	5	5	**18.5**

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 in order to decide the extent to which the initial site layout needs revision).

APPROVED ZANDBERG SAND MINE

The following generic criteria was used, in the 2014 EMPR, to describe magnitude and significance of impacts in a systematic manner.

The criteria are:

- extent or spatial scale of the impact;
- intensity or severity of the impact;
- duration of the impact;
- mitigation potential;
- acceptability;
- degree of certainty;
- status of the impact; and
- legal requirements.

Ratings are assigned for each criterion. The significance of impacts of the proposed project is assessed both with and without mitigation action.

IMPACT MAGNITUDE AND SIGNIFICANCE RATING	
HIGH	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.
MEDIUM	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible. Social, cultural and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.

IMPACT MAGNITUDE AND SIGNIFICANCE RATING	
NO IMPACT	Zero impact.

Extent and Spatial Scale

Extent or spatial scale of the impact description will be provided as to whether impacts are either limited in extent or affect a wide area or group of people.

RATING	DESCRIPTION
HIGH	Widespread. Far beyond site boundary. Regional / National / International Scale
MEDIUM	Beyond site boundary. Local area.
LOW	Within site boundary.

Intensity or Severity of Impacts

A description will be provided as to whether the intensity of the impact is high, medium, low or has no impact in terms of its potential for causing negative or positive effects.

RATING	DESCRIPTION
HIGH	Disturbance of pristine areas that have important conservation value. Destruction of rare or endangered species.
MEDIUM	Disturbance of areas that have potential conservation value or are of use as resources. Complete change in species occurrence or variety.
LOW	Disturbance of degraded areas, which have little conservation value. Minor change in species occurrence or variety.

Duration of the Impact

The duration of the impact will be classified as short term (0 to 5 years), medium term (5 to 15 years), long term (more than 15 years, with the impact ceasing after the operational life of the development) or considered permanent.

RATING	DESCRIPTION
HIGH (Long Term)	Permanent. Beyond decommissioning. Long term (More than 15 years).
MEDIUM (Medium Term)	Reversible over time. Lifespan of the project. Medium term (5 - 15 years)

RATING	DESCRIPTION
LOW (Short Term)	Quickly reversible. Less than the project lifespan. Short term (0 - 5 years).

Mitigation Potential

The potential to mitigate the negative impacts and enhance the positive impacts will be determined. For each identified impact, mitigation objectives that would result in a measurable reduction in impact should be provided. Management actions that could enhance the condition of the environment (i.e. potential positive impacts of the proposed project) will be identified. Performance criteria for reviewing or tracking the effectiveness of the proposed mitigation action will be provided where appropriate.

RATING	DESCRIPTION
HIGH	High potential to mitigate negative impacts to the level of insignificant effects.
MEDIUM	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
LOW	Little or no mechanism to mitigate negative impacts.

Acceptability

The level of acceptability often depends on the stakeholders, particularly those directly affected by the proposed project, legal limits, guidelines and industry standards.

RATING	DESCRIPTION
HIGH (Unacceptable)	Abandon project in part or in its entirety. Redesign project to remove or avoid impact.
MEDIUM (Manageable)	With regulatory controls. With project proponent's commitments.
LOW (Acceptable)	No risk to public health.

Degree of Certainty

A description is to be provided of the degree of certainty of the impact actually occurring as unsure, possible, probable, or definite (impact will occur regardless of prevention measures).

RATING	DESCRIPTION
DEFINITE	More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.
PROBABLE	Over 70% sure of a particular fact or of the likelihood of that impact occurring.
POSSIBLE	Only over 40% sure of a particular fact or of the likelihood of an impact occurring.

RATING	DESCRIPTION
UNSURE	Less than 40% sure of a particular fact or the likelihood of an impact occurring. No risk to public health.

SECTION 102 APPLICATION

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 particular 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 final 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 a given 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 15: 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 16: 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 17: 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 18: 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 19: 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 20: 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 21: 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 22: 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 23: 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 a number of 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)

APPROVED ZANDBERG SAND MINE

Project/site alternatives does not apply to the current Zandberg Sand Mine. The mine's approved EMPR (2014) notes that no alternative has been looked at as this operation has been in existence since 1994.

POSITIVE IMPACTS ASSOCIATED WITH THE ZANDBERG SAND MINE

(Information obtained from the Environmental Management Programme Report of Zandberg Sand Mine, 2014)

- Socio Economic – The mine will supply sand to the local building industry which will result in a positive economic impact.

NEGATIVE IMPACTS ASSOCIATED WITH THE ZANDBERG SAND MINE

(Information obtained from the Environmental Management Programme Report of Zandberg Sand Mine, 2014)

- Geology – The removal of material from the geological profile of the site;
- Topography – The mine will cause the formation of a local depression in the topographical profile;
- Soil Description – The removal of the sand will change the soil structure of the mine site;
- Land Capability – The excavation to be left as part of the mining activities will alter the land capability for the section temporarily;
- Land Use – The active mining area will temporarily be sterilized in terms of land use while the mined out sections of the site will be rehabilitated;
- Natural Vegetation – The current vegetation on the mine site area will be impacted on, in the short term on the mine site;
- Animal Life – The animal species (if any) will temporarily be displaced from the mine site due to the destruction of habitat and the mine related activities;

- Air Quality – Dust – The mine has the potential to cause dust pollution during high wind conditions;
- Visual Aspects – The mine will have very limited visual aspects.

S102 APPLICATION

SITE ALTERNATIVE 1

Site Alternative 1 (S1) entails the extension of the current mining footprint (17.6826 ha) with 108.3851 ha over Portion 4 of the farm Zandberg fontein No 97. S1 was selected as the preferred alternative for the following reasons:

- The proposed footprint offers the MR holder access to the sand deposit on the property.
- The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine.
- Access to the proposed mining area is possible from the existing farm road with a formal (existing) entrance onto the La Chasseur/Agter-Kliphoogte road.
- The proposed strip mining method and associated progressive rehabilitation of the area will minimise the visual impact of the activities on the receiving environment

LAYOUT ALTERNATIVE 1 (PREFERRED ALTERNATIVE)

Layout Alternative 1 (LA1) entails the mining of an approximate area of 27 ha within the proposed ±108 ha extension area, while the remaining area is protected as a no-go area. LA1 was identified as the preferred alternative due to the following:

- This option does allow the expansion of the mining area in a north/north-western direction;
- The proposed extension area is connected to the approved mining area, centralising mining to a specific portion of the farm and avoiding habitat fracturing. This layout will enable the MR Holder to gradually extend mining from the approved area into the proposed extension area;
- The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998;
- The BSA proposed/supports Layout Alternative 1, and deems the northern section an acceptable loss as this area covers a small portion of the dune plume with no exposed sandstone outcrops or drainage lines. The area is largely a uniform habitat type, and development within this section will not impact the status of the vegetation/ecosystem type, red data species or influence the conservation targets set out for the CBA1 area;

- The highly sensitive southern part of the extension area, as identified in the BSA, will be formally protected by the MR Holder as a biodiversity offset area that will form part of the mine's compliance obligations.
- This layout requires a smaller area to be rezoned from agricultural use to industrial use in terms of the municipal- and national spatial development legislation; and
- Although strip mining will be implemented, extending the mining area in a north/north-western direction will lessen the visual impact on the surrounding environment according to the viewshed analysis (refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on the site – Site Specific Visual Characteristics*).

LAYOUT ALTERNATIVE 2

Layout Alternative 2 (LA2) entails the mining of ±99 ha between the identified drainage lines within the proposed ±108 ha extension area. LA2 was not deemed the preferred option due to following:

- This layout requires a water use application to be submitted to the DWS in terms of the NWA, 1998 as mining is proposed within 100 m of the identified drainage lines;
- The BSA does not support LA2, as it will entail the removal of established Breede Sand Fynbos and North Sonderend Sandstone Fynbos to allow access to the mineral from especially the highly sensitive southern part of the proposed extension area. This layout will influence the conservation targets of the CBA1.
- Should mining extend into the southern part of the extension area, the MR Holder will have to implement search and rescue inspections prior to the mining of each consecutive strip to identify/confirm the presence of red data/protected plant species. Removal/destruction permits will then be needed for the identified species prior to the mining of the area.
- This layout requires the entire ±108 ha extension area to be rezoned from agricultural use to industrial use in terms of the municipal- and national spatial development legislation;
- Although strip mining will be implemented, extending the mining area over a ±99 ha area will have a higher visual impact on the surrounding environment; and
- The proposed mineable area (±99 ha) will temporarily be lost to agricultural use for the duration of the mining operation.

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 exploit the remaining sand resource on the property, resulting in a loss of potential income. The life

of mine of Zandberg Sandput (Pty) Ltd will depend on the availability of sand in the approved mining area.

- The landowner will not receive compensation for the use of the earmarked footprint on the property.
- The vegetation cover surrounding the approved mining area will not be disturbed by mining and should remain intact (bar other disturbance).
- Formal protection of the southern part of the extension area, as a biodiversity offset area, will not be possible.

POSITIVE IMPACTS ASSOCIATED WITH LA1 AND/OR LA2

- The MR Holder can utilize the sand resource on the property;
- The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine;
- The proposed strip mining method and associated progressive rehabilitation of the area will minimise the visual impact of the activities on the receiving environment;
- The mining area can be returned to agricultural zoning upon closure;
- The proposed extension area is connected to the approved mining area, centralising mining to a specific portion of the farm and avoiding habitat fracturing;
- LA1 - the 100 m buffer between the mineable area and the first drainage line will protect the drainage line from potential impacts associated with the mine, and no water use application is needed;
- LA1 – this layout will not impact the status of the vegetation/ecosystem type, red data species or influence the conservation targets set out for the CBA1 area; and the highly sensitive southern part will be protected;
- LA1 – smaller area needs to be rezoned from agricultural to industrial use;
- LA1 – will have a smaller visual impact; and
- LA2 – will offer the MR Holder a larger mining area with a prolonged life of mine.

POTENTIAL NEGATIVE IMPACTS ASSOCIATED WITH LA1 & LA2

STRIPPING AND STOCKPILING OF TOPSOIL

- Alteration of the agricultural sense of place;
- Loss of agricultural land for duration of mining;
- Visual intrusion as a result of mining;
- Potential impact on vegetation and listed and protected plant species;
- Potential impact on the CBA1 area;
- Loss of topsoil and fertility during mining and stockpiling;
- Infestation of the topsoil heaps and mining area with invader plant species;

- Potential impact on local fauna due to disturbance and loss of available habitat and migration routes;
- Dust nuisance as a result of the mining activities;
- Noise nuisance as a result of the mining activities;
- Potential impact on archaeological artefacts;
- Potential impact on the drainage lines/watercourses within the mining area;
- Potential increased erosion risk and destabilisation of the dune plume;

EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

- Visual intrusion associated with the extraction of material;
- Creating steep slopes and uneven surfaces;
- Soil contamination from hydrocarbon spills;
- Disturbance to fauna within the footprint area;
- Dust nuisance as a result of the mining activities;
- Noise nuisance as a result of the mining activities;
- Potential impact associated with littering at the mining area;
- Potential impact on areas of palaeontological concern;
- Facilitation of erosion;

TRANSPORTING OF MATERIAL

- Dust nuisance caused by vehicles transporting the material;
- Degradation of the access roads;
- Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity;

CUMULATIVE IMPACTS

- Reduced ability to meet conservation obligations and targets;
- Impact the broad-scale ecological processes;
- Cumulative impact of projects on palaeontological resources;

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

- Erosion of returned topsoil after rehabilitation;
- Infestation of the reinstated area with invader plant species;
- Potential impact associated with litter left at the mining area;
- Uneven surfaces or steep slopes left upon closure of the site.

In light of the above, and the review of the potential impacts associated with the different development options, Layout Alternative 1 is deemed the preferred development option.

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 impact of the Zandberg Sand Mine on the surrounding environment:

TOPOGRAPHY

Landscaping of Mining Area:

- To ensure minimum impact on drainage, it is essential that no depressions are left in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining depths must be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area.
- Mining depths must be controlled across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges.
- No mining may extend into/below the underlying sandstone layer.
- After mining, any steep slopes at the edges of excavations must be reduced to a minimum and profiled to blend with the surrounding topography. The entire surface must be sufficiently smoothed and profiled to allow cultivation.

VISUAL CHARACTERISTICS

Visual Mitigation:

- The site must have a neat appearance and be kept in good condition at all times.
- Mining equipment (FEL) must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use.
- Concurrent rehabilitation must be done as strip 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.

Fugitive Dust Emission Mitigation:

- 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.
- Speed on the access road must be limited to 20 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 the site to minimize potential dust impacts.
- No potable water may be used for dust suppression purposes.

Noise Handling:

- The MR holder 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 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.

GEOLOGY AND SOIL

Topsoil Management:

- The upper 300 mm of the soil, of the strip to be mined, 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 of plants on the stockpiles will help to prevent erosion.
- Topsoil heaps may not exceed 1.5 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 MR holder 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

Erosion Control and Storm Water Management:

- Soil that are to be removed must be done so at right angles to the slope, as this will slow down surface runoff and help to prevent erosion.
- No mining may extend into/below the underlying sandstone layer.
- When mining within steep slopes, it must be ensured that adequate slope protection is provided.

- Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion.
- During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur.
- Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Phased mining and vegetation clearance must be done, wherein small strips (±0.25 ha) are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation must occur wherein a stable vegetation cover is established with at least a grass cover.
- Roads and other disturbed areas within the project area must be regularly monitored for erosion and problem areas must receive follow-up monitoring to assess the success of the remediation.
- Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur.
- Silt/sediment traps/barriers must be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. These sediment/silt barriers must regularly be maintained and cleared so as to ensure effective drainage of the areas.
- Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms.
- Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary.
- 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.

Management of Drainage Areas:

- The MR Holder must adhere to the layout of LA1, as proposed in this document, with the southern part (±81 ha) of the proposed extension area (including all drainage areas) regarded as a no-go area (as indicated in the Site Activities Map attached as Appendix C) and treated as a Biodiversity Offset Area.
- The MR Holder must demarcate a 100 m buffer area from the most northern drainage line and manage it as part of the abovementioned no-go area where no mining may take place.

MINING, BIODIVERSITY CONSERVATION AREAS, AND VEGETATION

Management of Vegetation Removal and Conservation of the CBA:

- The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.
- The MR Holder must adhere to the layout of LA1, as proposed in this document, with the southern part (±81 ha) of the proposed extension area regarded as a no-go area (as indicated in the Site Activities Map attached as Appendix C) and treated as a Biodiversity Offset Area.
- A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist, for species of conservation concern that would be affected (also to comply with the Western Cape Nature Conservation Ordinance and DEA&DP permit conditions).
- Permits for the removal of protected plant species (if required) must be kept on-site and in the possession of the flora search and rescue team at all times.
- A pre-commencement environmental induction for all staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc.
- The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place.

- Clearing of vegetation must be limited to the proposed mining footprint (LA1) and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Phased mining and vegetation clearance must be done, wherein small strips (±0.25 ha) are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation should occur wherein a stable vegetation cover is established with at least a grass cover.
- All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed.
- No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits.
- No fires must be allowed on-site.

Management of Invasive Plant Species:

- An invasive plant species management plan (Appendix K) 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) must be kept free of invasive plant species.
- No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed.
- 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) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.

Cumulative Impacts:

- The MR Holder must adhere to the layout of LA1, as proposed in this document, with the southern part (±81 ha) of the proposed extension area regarded as a no-go area (as indicated in the Site Activities Map attached as Appendix C) and treated as a Biodiversity Offset Area.
- The activity footprints of various proposed mining locations and other development proposals in the area must be kept to a minimum and a stable vegetation must be encouraged to return during the post-operational phase.

- The footprint of mining areas within sensitive habitat types must be reduced as much as possible.

FAUNA

Protection of 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 the ECO or other suitably qualified 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 (20 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises.
- When possible, no activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed).
- No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed from the mining area.

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 Heritage Western Cape (HWC).
- Work may only continue once the go-ahead was issued by HWC.
- The Fossil Chance Find Protocol attached as part of the HIA (Appendix J) must be implemented for the duration of the operational phase.

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-out/rehabilitated areas will revert back 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 road 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 MR Holder.
- Overloading of the trucks must be prevented.
- The MR Holder must adhere to the DTPW conditions submitted as part of the land use application.

GENERAL

Waste Management:

- Regular vehicle maintenance, repairs and services may only take place at the off-site 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 (off-site) in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored (to prevent blowing/falling over) and shall be serviced at least once a month for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- The use of any temporary, chemical toilet 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 from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the MR holder.

- 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. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the off-site workshop, where it is incorporated into the hazardous waste removal system as discussed above.
- 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. The safe disposal certificates must be filed for auditing purposes.
- An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.
- 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 from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.
- All general waste must be contained within the site vehicles and daily be removed from the mining area to the general waste storage area at the offices on the farm. No general waste may be burned or buried on the farm, but must be disposed of at the Robertson landfill site.
- No waste may be stored, 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. The affected area must be cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned.
- Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area.
- All employees must be aware of the Emergency Response Procedures attached to this document as Appendix P.

Management of Health and Safety Risks:

- Access to the mining area by unauthorised persons is to be prevented by the Mine Manager, as far as is reasonably practical.
- Adequate ablution facilities and water for human consumption must daily be available on site.
- Sanitary facilities must be located within 100 m from any point of work.
- 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)

APPROVED ZANDBERG SAND MINE

Not applicable.

S102 APPLICATION

As mentioned earlier, the environmental assessment considered two layout alternatives that would allow the extension of the existing Zandberg Sand Mine. The footprint of LA1 allows for the mining of ±27 ha of the proposed ±108 ha extension area, while LA2 will provide the MR Holder with ±99 ha from where sand could be mined. The following matters contributed to the identification of the preferred development footprint (LA1):

1. **Visual Characteristics** – The small scale of the proposed operation (±0.5 ha affected at a time), proposed progressive rehabilitation, as well as the fact that no infrastructure will be established assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine.

2. **Hydrology** – The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998.

   The MR Holder proposes to mine the sand resource up to the underlying sandstone layer that gradually inclines up the hill. The sandstone layer will be the limiting depth of the proposed mining activity. In order to avoid impacting on infiltration, groundwater recharge and flow, the Department of Water and Sanitation (DWS) generally stipulates that sand mining not be allowed within 1.5 m of the groundwater level. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from the proposed extension area will intercept (or come within 1.5 m) the groundwater layer.

3. **Biodiversity, Conservation, and Groundcover** – Should LA1 be approved, the loss of vegetation will according to the botanist not affect the conservation targets, compromise the ecological functioning of the larger "natural" environment, or disrupt the connectivity of the landscape for fauna and flora or impair their ability to respond to environmental fluctuations. According to the BSA the northern section of the site (±27 ha – LA1) can be regarded as acceptable loss to the development as this area covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. The remaining southern area (±81 ha) will be set aside to function as a biodiversity offset area that will form part of the mine's compliance obligations.

4. **Cultural and Heritage Environment** – The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

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).

The following section provides a description of the findings and recommendations of the EIAR, inclusive of the relevant specialist studies, and its associated impact on the receiving and surrounding environment. The impacts and risks associated with the sand mining operation were separated into the impacts associated with **the Approved Zandberg Sand Mine**, and those associated with the **S102 Application**.

APPROVED ZANDBERG SAND MINE

The following impacts are those listed in the 2014 EMPR of the mine. The impact significance was determined for each impact after brining the mitigation measures into consideration and therefore represents the final layout/activity proposal.

CONSTRUCTION PHASE

The EMPR did not identify construction phase impacts as this phase has been completed. Construction phase related impacts were addressed as it occurred, and mitigating and monitoring

measures were put in place to reduce the force of the impacts. Zandberg Sand Mine is now in the operational phase.

OPERATIONAL PHASE

The current EMPR (2014) identified the following impacts as being directly or indirectly associated with the mining operation.

Table 24: Impact / Aspect Register from the Zandberg Sand Mine approved EMPR (2014).

GEOLOGY	The removal of material from the geological profile of the site.
TOPOGRAPHY	The mine will cause the formation of a local depression in the topographical profile
SOIL DESCRIPTION	The removal of the sand will change the soil structure of the mine site
LAND CAPABILITY	The excavation to be left as part of the mining activities will alter the land capability for that section temporarily.
LAND USE	The active mining area will temporarily be sterilized in terms of land use while the mined out sections of the site will be rehabilitated.
NATURAL VEGETATION	⁜ The current vegetation on the mine site area will be impacted on, in the short term on the mine site. ⁜ The area will be restored to natural vegetation.
ANIMAL LIFE	The animal species (if any) will temporarily be displaced from the mine site due to the destruction of habitat and the mine related activities.
SURFACE WATER	The mining operations will not impact on surface water due to the sandy nature of the soil.
GROUND WATER	The groundwater regime will not be impacted upon by the mining operations other than the leaching of a limited amount of water out of the geological profile.
AIR QUALITY – DUST	The mine has the potential to cause dust pollution during high wind conditions.
AIR QUALITY – EMISSIONS	⁜ All vehicles will be professionally maintained and serviced to ensure that engine emissions are within the accepted limits. ⁜ No fires will be allowed on site
ARCHAEOLOGY	Should any artefacts be uncovered by the mining operations it will be reported to the relevant authority (South African Heritage Resources Agency (SAHRA)).
SENSITIVE LANDSCAPES	The proposed mine is not located within a designated sensitive areas.
VISUAL ASPECTS	⁜ The mine will have very limited visual aspects. ⁜ Rehabilitation will mitigate the impact
SOCIO-ECONOMIC	The mine will supply sand to the local building industry which will result in a positive economic impact.
INTERESTED & AFFECTED PARTIES	The impact of the mine on I&AP's will be based on ongoing consultation with the owners and neighbouring farmers.

ENVIRONMENTAL IMPACT ASSESSMENT RESULTS

(According to the 2014 EMPR)

The 2014 EMPR assessed the environmental related impacts as listed in the table below.

Table 25: Environmental Impact Assessment Results from the Zandberg Sand Mine approved EMPR (2014).

Impact	Impact Magnitude & Significance	Spatial Scale of Impact	Impact Severity / Intensity	Duration of Impact	Mitigation Potential	Acceptability of Impacts	Certainty of Impacts
IMPACT ON THE PHYSICAL AND CHEMICAL COMPONENTS							
Geology	Low	Low	Low	Medium	Medium	Low	Definite
Air Quality – Dust	Low	Medium	Low	Low	Low	Low	Definite
Air Quality – Emissions	Low	Low	Low	Low	Low	Low	Probable
Groundwater	Low	Low	Low	Medium	Low	Low	Probable
Visual Aspects	Low	Low	Low	Medium	Low	Low	Definite
Surface Water	Low	Low	Low	Medium	Low	Low	Probable
Topography	Low	Low	Low	Medium	Low	Low	Definite
IMPACT ON THE BIOLOGICAL AND ECOLOGICAL COMPONENTS							
Natural Vegetation	Medium	Low	Medium	Medium	High	Medium	Definite
Soils	Low	Low	Low	Low	High	Low	Definite
Sensitive Landscapes	Low	Low	Low	Low	High	Low	Definite
Land Use	Low	Low	Low	Medium	High	Low	Definite
Land Capability	Low	Low	Low	Low	High	Low	Definite
Animal Life	Low	Low	Low	Low	High	Low	Probable
IMPACT ON SOCIOLOGICAL AND CULTURAL COMPONENTS							

Impact	Impact Magnitude & Significance	Spatial Scale of Impact	Impact Severity / Intensity	Duration of Impact	Mitigation Potential	Acceptability of Impacts	Certainty of Impacts
Interested and Affected Parties	Low	Low	Low	Medium	High	Low	Probable
Archaeological Artefacts	Low	Low	Low	High	Low	Medium	Possible
Noise	Low	Low	Low	Low	High	Low	Probable
IMPACT ON ECONOMICAL AND OPERATIONAL COMPONENTS							
Regional Socio Economic Structure	Low (Positive)	Low	Low	Medium	High	High	Definite

SECTION 102 APPLICATION

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 two identified layout alternatives (LA1 & LA2) 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.

STRIPPING AND STOCKPILING OF TOPSOIL

Alteration of the agricultural sense of place

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	5	3.5	**9.1**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	5	3.5	**10.5**

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
1	4	1	2	5	2	3.5	**7**
Rating: Low-Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
2	4	1	2.3	5	2	3.5	**8**

Visual intrusion as a result of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
2	4	2	2.6	3	5	4	**10.4**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
2	4	3	3	4	5	4.5	**13.5**

Potential impact on vegetation and listed and protected plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
4	5	1	3.3	2	2	2	**6.6**
Rating: Low-Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
5	5	1	3.6	3	2	2.5	**9**

Potential impact on the CBA1 area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Medium-High			**Layout Alternative 2**		**Degree of Mitigation: No Mitigation**		
5	5	5	5	4	2	3.5	**17.5**

Loss of topsoil and fertility during mining and stockpiling

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
3	2	1	2	2	1	1.5	**3**
Rating: Low			**Layout Alternative 2**		**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			**Layout Alternative 1**		**Degree of Mitigation: Full**		
2	1	2	1.6	2	2	2	**3.2**
Rating: Low			**Layout Alternative 2**		**Degree of Mitigation: Full**		
2	1	2	1.6	2	2	2	**3.2**

Potential impact on local fauna due to disturbance and loss of available habitat and migration routes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
1	4	2	2.6	1	5	3	**7.8**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
2	4	2	3	4	5	4.5	**13.5**

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

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

Potential impact on archaeological artefacts

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
5	5	4	4.6	1	1	1	**4.6**
Rating: Low			**Layout Alternative 2**		**Degree of Mitigation: Full**		
5	5	4	4.6	1	1	1	**4.6**

Potential impact on the drainage lines/watercourses within the mining area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
1	5	2	4.3	1	1	1	**4.3**
Rating: Low-Medium			**Layout Alternative 2**		**Degree of Mitigation: Full**		
2	5	2	4.3	2	2	2	**8.6**

Potential increased erosion risk and destabilisation of the dune plume

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

EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

Visual intrusion associated with the extraction of the mineral

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**		**Degree of Mitigation: Partial**		
2	4	2	2.6	3	5	4	**10.4**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Partial**		
2	4	3	3	4	5	4.5	**13.5**

Creating steep slopes and uneven surfaces

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
1	3	1	1.6	2	2	2	**3.2**
Rating: Low			**Layout Alternative 2**		**Degree of Mitigation: Full**		
1	3	1	1.6	2	2	2	**3.2**

Soil contamination from hydrocarbon spills

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

Disturbance to fauna within the footprint area

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

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

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

Potential impact associated with littering at the mining area

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

Potential impact on areas of palaeontological concern

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
4	5	4	3	1	1	1	**3**
Rating: Low			**Layout Alternative 2**		**Degree of Mitigation: Full**		
4	5	4	3	1	1	1	**3**

Facilitation of erosion

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

TRANSPORTING OF MINERAL

Dust nuisance caused by vehicles transporting the mineral

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Full**		
2	5	2	3	2	2	2	**6**
Rating: Low-Medium			**Layout Alternative 2**		**Degree of Mitigation: Full**		
2	5	2	3	2	2	2	**6**

Degradation of the access road

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

Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**		**Degree of Mitigation: Full**		
2	5	2	3	2	1	1.5	**4.5**
Rating: Low			**Site Alternative 2**		**Degree of Mitigation: Full**		
2	5	2	3	2	1	1.5	**4.5**

CUMULATIVE IMPACTS

Reduced ability to meet conservation obligations and targets

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**		**Degree of Mitigation: Full**		
1	5	1	2.3	1	5	3	**6.9**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: No Mitigation**	
2	5	5	4	4	5	4.5	**18**
Rating: Medium			**Layout Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
1	5	5	3.6	2	5	3.5	**12.6**
Rating: High			**Layout Alternative 2 with other projects in the area**			**Degree of Mitigation: No Mitigation**	
4	5	5	4.6	4	5	4.5	**20.7**

Impact the broad-scale ecological processes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Layout Alternative 1**			**Degree of Mitigation: Full**	
1	5	1	2.3	1	5	3	**6.9**
Rating: Medium-High			**Layout Alternative 2**			**Degree of Mitigation: No Mitigation**	
2	5	5	4	4	5	4.5	**18**
Rating: Medium			**Layout Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	
1	5	5	3.6	2	5	3.5	**12.6**
Rating: High			**Layout Alternative 2 with other projects in the area**			**Degree of Mitigation: No Mitigation**	
4	5	5	4.6	4	5	4.5	**20.7**

Cumulative impact of projects on palaeontological resources

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Layout Alternative 1**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**
Rating: Low			**Layout Alternative 2**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**
Rating: Low			**Layout Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**
Rating: Low			**Layout Alternative 2 with other projects in the area**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

Erosion of returned topsoil after rehabilitation

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

Infestation of the reinstated area with invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Layout Alternative 1**		**Degree of Mitigation: Full**		
1	1	1	1	2	2	2	**2**
Rating: Medium			**Layout Alternative 2**		**Degree of Mitigation: Full**		
1	1	1	1	2	2	2	**2**

Potential impact associated with litter left at the mining area

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

Uneven surfaces or steep slopes left upon closure of the site

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

Return of the mining area to agricultural use upon closure **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: N/A**		
1	5	5	3.7	5	5	5	**18.5**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: N/A**		
1	5	5	3.7	5	5	5	**18.5**

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 26: 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.
APPROVED ZANDBERG SAND MINE						
Sand mining.	⁜ Impact on the physical and chemical components.	⁜ Geology. ⁜ Air Quality – Dust. ⁜ Air Quality – Emissions. ⁜ Groundwater. ⁜ Visual Aspects. ⁜ Topography.	Operational Phase	⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low	<u>Control & Remedy:</u> Proper housekeeping and implementation of the proposed mitigation measures.	⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low
Sand mining.	⁜ Impact on the biological and	⁜ Natural Vegetation. ⁜ Soils.	Operational Phase	⁜ Medium ⁜ Low	<u>Control & Remedy:</u> Proper housekeeping and implementation	⁜ Medium ⁜ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	ecological components.	⁜ Sensitive Landscapes. ⁜ Land Use. ⁜ Land Capability. ⁜ Animal Life.		⁜ Low ⁜ Low ⁜ Low ⁜ Low	of the proposed mitigation measures.	⁜ Low ⁜ Low ⁜ Low ⁜ Low
Sand mining.	⁜ Impact on sociological and cultural components.	⁜ Interested and Affected Parties. ⁜ Archaeological Artefacts. ⁜ Noise.	Operational Phase	⁜ Low ⁜ Low ⁜ Low	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ Low ⁜ Low ⁜ Low
Sand mining.	⁜ Impact on economical and operational components.	⁜ Regional Socio Economic Structure.	Operational Phase	⁜ Low (Positive)	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ Low (Positive)
SECTION 102 APPLICATION						
⁜ 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	N/A	Control: Implementation of proper housekeeping and site management.	N/A
⁜ Stripping and stockpiling of topsoil.	⁜ Alteration of the agricultural sense of place.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	❖ Medium (LA1) ❖ Medium (LA2)	The study area does not have a high agritourism potential, and the sand mine has a low visibility. The significance is therefore deemed to be low-medium (LA1) during the	❖ Low-Medium (LA1) ❖ Medium (LA2)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
					operational phase and negligible upon the closure of the mine.	
⁜ Stripping and stockpiling of topsoil.	⁜ Loss of agricultural land for duration of mining.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	⁜ Medium (LA1) ⁜ Medium (LA2)	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.	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of the mineral.	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	⁜ Medium-High (LA1) ⁜ Medium-High (LA2) ⁜ Medium-High (LA1) ⁜ Medium-High (LA2)	Control: Proper housekeeping and implementation of progressive rehabilitation.	⁜ Medium (LA1) ⁜ Medium (LA2) ⁜ Medium (LA1) ⁜ Medium (LA2)
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on vegetation and listed and protected plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	⁜ Medium (LA1) ⁜ Medium (LA2)	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on the CBA1 area.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	⁜ Low-Medium (LA1) ⁜ Medium-High (LA2)	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	⁜ Low (LA1) ⁜ Medium-High (LA2)
⁜ Stripping and stockpiling of topsoil.	⁜ Loss of topsoil and fertility during mining and stockpiling.	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment, Operational- and	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2) ⁜ Medium (LA1)	Control & Remedy: Proper housekeeping and storm water management.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Potential erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion. ⁜ Erosion of returned topsoil after rehabilitation.		Decommissioning Phase	⁜ Medium (LA2) ⁜ Medium (LA1) ⁜ Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)		⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (medium- & long term).	⁜ Infestation of the topsoil heaps and mining area 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	⁜ Medium (LA1) ⁜ Medium (LA2) ⁜ Medium (LA1) ⁜ Medium (LA2)	<u>Control:</u> Implementing soil- and invader plant control/management.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. ⁜ Disturbance to fauna within the footprint area.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	⁜ Medium (LA1) ⁜ Medium-High (LA2) ⁜ Low (LA1) ⁜ Low (LA2)	<u>Control & Stop:</u> Implementing good management practices.	⁜ Low-Medium (LA1) ⁜ Medium (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Stripping and stockpiling of topsoil.	⁜ Dust nuisance as a result of the mining activities.	Increased dust will impact on the air quality	Site Establishment- & Operational Phase	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)	<u>Control:</u> Dust suppression methods and proper housekeeping.	⁜ Low (LA1) ⁜ Low (LA2)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of mineral.	⁜ Dust nuisance caused by vehicles transporting the mineral.	of the receiving environment.		⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2) ⁜ Medium (LA1) ⁜ Medium (LA2)		⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Noise nuisance as a result of the mining activities. ⁜ Noise nuisance as result of the mining 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 (LA1) ⁜ Low-Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)	Control: Noise suppression methods and proper housekeeping.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeonological concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment- and, Operational Phase	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)	Control & Stop: Implementation of a chance-find procedure.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on the drainage lines/watercourses within the mining area.	This impact could affect the hydrology of the surrounding environment.	Site Establishment- and, Operational Phase	⁜ Low-Medium (LA1) ⁜ Medium-High (LA2)	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	⁜ Low (LA1) ⁜ Low-Medium (LA2)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Creating steep slopes and uneven surfaces.	The impact will prevent or hinder future cultivation.	Operational-, and Decommissioning Phase	⁜ Medium (LA1) ⁜ Medium (LA2) ⁜ Medium (LA1) ⁜ Medium (LA2)	Control: Effective rehabilitation according to the closure plan.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	⁜ Uneven surfaces or steep slopes left upon closure of the site.					
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscapting (medium- & long terrm).	⁜ Soil contamination from hydrocarbon spills. ⁜ Potential impact associated with littering at the mining area. ⁜ Potential impact associated with litter 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	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)	<u>Control & Remedy:</u> Proper housekeeping and implementation of the emergency response procedures and waste management registers.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Transporting of mineral.	⁜ Degradation of the access roads. ⁜ Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	Collapse of the internal road infrastructure will affect the landowner negatively, and if the mine negatively affect public traffic it may incur additional costs and complaints from the public.	Operational Phase	⁜ Medium (LA1) ⁜ Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)	<u>Control & Remedy:</u> 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 (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	⁜ Low-Medium (LA1) ⁜ Medium-High (LA2) ⁜ Medium-High (LA1+) ⁜ High (LA2+)	<u>Modify & Control</u>: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	⁜ Low-Medium (LA1) ⁜ Medium-High (LA2) ⁜ Medium (LA1+) ⁜ High (LA2+)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	⁜ Low-Medium (LA1) ⁜ Medium-High (LA2) ⁜ Medium-High (LA1+) ⁜ High (LA2+)	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	⁜ Low-Medium (LA1) ⁜ Medium-High (LA2) ⁜ Medium (LA1+) ⁜ High (LA2+)
⁜ Cumulative Impacts	⁜ Cumulative impact of projects on palaeontological resources.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2) ⁜ Low-Medium (LA1) ⁜ Low-Medium (LA2)	Control & Stop: Implementation of a chance-find procedure.	⁜ Low (LA1) ⁜ Low (LA2) ⁜ Low (LA1) ⁜ Low (LA2)

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

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 27: 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
Heritage Impact Assessment: Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm	**Palaeontology – Mitigation Measures:** In respect of mitigation measures, the PIA recommends the inclusion of a Fossil Chance Find Protocol in the EMPr. This will ensure that in the unlikely event of fossils being encountered	All the recommendations proposed by the specialist are implemented on site.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: *Cultural and Heritage Environment.*

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
Zandbergfontein, Robertson, Western Cape. April 2020 *(See Appendix J for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	during mining, they will be rescued and a palaeontologist called to assess and collect a representative sample. **<u>Other Heritage Resources – Mitigation Measures:</u>** Should any human remains be encountered at any stage during the construction or earthworks associated with the project, mining in the vicinity must cease immediately, the remains must be left in situ but made secure and the project archaeologist and HWC must be notified immediately.		Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: *Archaeological, Heritage and Paleontological Aspects.* Part A(1)(u)(i)(2) Impact on any national estate referred to in section 3(2) of the NHRA.
Botanical Study and Assessment Proposed expansion of the sand mine area on Portion 4 of the farm Zandberg Fontein 97, South of Robertson, Western Cape Province. April 2020 *(See Appendix I2 for a full copy of the document)* Conducted in accordance with the requirements of Appendix 6	**<u>Recommendations:</u>** <u>Sensitivity and associated development recommendations:</u> - As already described the entire project area is regarded as highly sensitive. - The northern section of the site can be regarded as acceptable for the development as this area (north of the prominent drainage line) covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. Subsequently this area is largely a uniform habitat type, and development within this section will not impact the status of the vegetation / ecosystem type, red data species or influence the conservation targets set out for this CBA1 area.	All the recommendations proposed by the specialist was incorporated into this document.	Part A(1)(d)(ii) Description of the activities to be undertaken: 2. S102 Application. Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Vegetation. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Vegetation. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation.

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
of the NEMA EIA Regulations 2014 (as amended).	⁎ Furthermore, by restricting mining activities to this area adjacent to the existing mining area, potential impacts are "compressed" in a confined area avoiding further habitat fracturing as well as influencing important biological corridors. ⁎ Due to high habitat (micro-habitat), fine scale vegetation pattern and plant species turnover associated with the southern half of the project site as well as the functions and services associated with some of these habitat type, it is recommended that this southern portion is excluded from the proposed mining footprint. Also, this area is regarded as an important portion of the CBA1. All drainage lines are regarded as high sensitivity, No-Go features. ⁎ The northern portion of the dune plume regarded as acceptable for the proposed activity covers approximately 30% of the original extent that is being proposed. The remaining area must be treated as a biodiversity offset area. <u>Important recommendations and mitigation measures</u> ⁎ The southern portion of the proposed mining footprint should be excluded from the final layout and should be regarded as a No-Go area (as indicated in the sensitivity map) and treated as a Biodiversity Offset Area. ⁎ However, the northern section of the site can be regarded as acceptable loss to the development as this area (north of the prominent drainage line) covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. Subsequently this area is largely a uniform habitat type, and development within this section		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: Section 102 Application.

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
	will not impact the status of the vegetation / ecosystem type, red data species or influence the conservation targets set out for this CBA1 area. Furthermore, by restricting mining activities to this area adjacent to the existing mining area, potential impacts are "compressed" in a confined area avoiding further habitat fracturing as well as influencing important biological corridors Phased mining and vegetation clearance should be done, wherein small strips are mined. All vegetation outside of the active strips should not be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation should occur wherein a stable vegetation cover is established with a grass cover. Even though a stable vegetation cover will allow for some functionality to return, an establishment of a natural fynbos cover representative of the region is near impossible. The following aspects should be noted regarding the rehabilitation of sand fynbos: • Sand Fynbos occurs on acidic, deep, loose, sandy soils which are easily destabilized and prone to wind erosion. • Wind-blown sand damages vegetation and makes it difficult to establish vegetation cover, therefore anti-soil erosion measures may be required. • Disturbed areas are slow to self-repair, therefore active restoration (e.g. sowing and planting) will be required. • Ecological restoration does not substitute for sustainably managing and protecting intact native ecosystems.		

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
	• Fynbos ecosystems are prone to invasion by alien species and alien plant invasion is the second biggest cause of biodiversity loss after direct habitat loss. The management and eradication of Invasive Alien Plants (IAPs) are therefore a critical portion of the rehabilitation process and a detailed IAP Management Plan is should be in place. ⁂ It is recommended to use a mix of commercial seed and native seed, including both annuals and perennials to diversify rooting depths. For dryland areas, the commercial seed mix should be less than half the standard sowing rate and include annuals (e.g. wheat or rye) and perennials e.g. Kweek (*Cynodon dactylon*). Add commonly available fynbos seeds (collected from as near to the site as possible), including annuals (e.g. *Arctotis arctotoides, Dimorphotheca chrysanthemifolia, D. nudiaulis, Helichrysum cymosum, Osteospermum oppositifolium*), grasses (*Ehrharta villosa, E. calycina, Festuca scabra* and *Stipagrostis zeyheri*), succulents (*Carpobrotus edulus, Ruschia pungens*) and shrubs (e.g. *Athanasia quinquedentata, Chrysocoma ciliata, Elytropappus rhinocerotis, Metalasia adunca, Stoebe nervigera, Eriocephalus africanus, Helichrysum odoratissimum* and *Agatoshma stipitata*). The collection of local fynbos seed, if possible, is preferable for establishing fynbos species in favour of introducing Kweek, as Kweek may supress fynbos establishment, particularly in wetter areas.		

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 extension of the mining area entail the following:

Project proposal:

- Zandberg Sandput (Pty) Ltd submitted S102 amendment application to add 108.3851 ha to the current 17.6826 ha mining footprint. LA1 is the preferred alternative that will allow the MR Holder a mineable area of ±27 ha within the 108.3851 ha footprint. Should the S102 application be approved, mining will advance into the extension area as the current mining footprint (±17.7 ha) is mined-out. The mining method will remain the same as the method currently implemented by the MR holder, and no infrastructure will be established in the extension area.

Visual Characteristics:

- The footprint of S1 is mainly visible from the north-east to the south-west within an approximate area of 3-4 km from the mining area. Within close proximity the mining area is/will be visible from the neighbouring La Chasseur/Agter-Kliphoogte road.
- The viewshed analysis of LA1 shows that the mining operation/effect will be hidden from the south/south-western side of the farm and surrounding environment.
- The small scale of the proposed operation (±0.5 ha affected at a time), proposed progressive rehabilitation, as well as the fact that no infrastructure will be established assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine.

Air and Noise Quality:

- The prevalent wind direction of the study area is in a northern direction during the summer/spring months, changing to a west-north-western wind (blowing east-south-east) during winter/autumn, highly reducing the potential of dust blowing from the operation towards the surrounding landowners.

- The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

Geology:

- A dune-like layer of sand, several meters thick, is found against the southern slope of the Zandberg. The sand layer is exposed in certain areas (blow-outs), but mainly covered by natural vegetation along the extend of the mountainside. A layer of pedocrete separates the bedrock from the sand. All of these layers are porous and water moves readily through the sand, while the downward movement is somewhat slowed by the pedocrete.

Hydrology:

- The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998.
- The wetland report (WATSAN 2016) concluded that the impact of the Zandberg sand mine on the infiltration of groundwater is small and that the effect on the entire aquifer will hardly be noticed. The study further confirmed that no natural wetlands were present within the approved mining area.
- The MR Holder proposes to mine the sand resource up to the underlying sandstone layer that gradually inclines up the hill. The sandstone layer will be the limiting depth of the proposed mining activity. In order to avoid impacting on infiltration, groundwater recharge and flow, the Department of Water and Sanitation (DWS) generally stipulates that sand mining not be allowed within 1.5 m of the groundwater level. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from the proposed extension area will intercept (or come within 1.5 m) the groundwater layer.

Biodiversity Conservation Areas:

- When the footprint of S1 is layered over the Mining and Biodiversity Guideline Map it falls over an area of highest biodiversity importance with a

corresponding rating of highest risk for mining. The area of highest biodiversity importance also corresponds with the Langeberg CBA as identified in the 2017 Western Cape Biodiversity Spatial Plan.

- Should LA1 be approved, the loss of vegetation will according to the botanist not affect the conservation targets, compromise the ecological functioning of the larger "natural" environment, or disrupt the connectivity of the landscape for fauna and flora or impair their ability to respond to environmental fluctuations.

Vegetation:

- The BSA reports that the vegetation of the study site resembles pristine forms of Breede Sand Fynbos throughout the majority of the site, together with pristine North Sonderend Sandstone Fynbos in the Western and south-western corner, adjacent to drainage lines.
- According to the BSA the northern section of the site (±27 ha – LA1) can be regarded as acceptable loss to the development as this area covers a very small portion of the dune plume with no exposed sandstone outcrops or drainage lines and is furthermore located adjacent to the existing mining area. The remaining southern area (±81 ha) will be set aside to function as a biodiversity offset area that will form part of the mine's compliance obligations.

Cultural and Heritage Environment:

- The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

Socio-Economic Environment:

- The proposed extension of the mining area will not require an increase in the number of employees. The company has fully embraced the concept of sectoral training and has access to the activities of SETA (Sector Education and Training Authority) and MQA (Mining Qualifications

Authority). The mine will continue to pay the skills development levies of all its employees to the South African Receiver of Revenue as a legal requirement.

- The LED project allocated to Zandberg Sandput (Pty) Ltd and approved by the municipality is the installation of block paving/cement slabs at the Willem Buchaltz School, La Chasseur Robertson.

Existing Infrastructure:

- Apart from the power line that follows the La Chasseur/Agter-Kliphoogte road just inside the farm boundary, no other infrastructure has been established on the property that can be affected by the proposed extension development.

Land Use:

- Mining will temporarily affect ±27 ha of the earmarked property.
- The mine will continue with the progressive rehabilitation of mined out areas to in the end restore the entire mining footprint to an area with indigenous vegetation that can once again be zoned for agriculture.

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 extension of the mining area in terms of S1 and LA1 include the following:

- The proposed footprint offers the MR holder access to the sand deposit on the property.
- The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine.
- Access to the proposed mining area is possible from the existing farm road with a formal (existing) entrance onto the La Chasseur/Agter-Kliphoogte road.

- The proposed strip mining method and associated progressive rehabilitation of the area will minimise the visual impact of the activities on the receiving environment.
- LA1 allows the expansion of the mining area in a north/north-western direction.
- The proposed extension area is connected to the approved mining area, centralizing mining to a specific portion of the farm and avoiding habitat fracturing. This layout will enable the MR Holder to gradually extend mining from the approved area into the proposed extension area.
- The proposed 100 m buffer between the minable area and the first drainage line will protect the drainage line from potential impacts associated with the mining. As the mineable area will be >100 m from the drainage line, the MR Holder does not trigger an application in terms of the NWA, 1998.
- The BSA proposed/supports Layout Alternative 1, and deems the northern section as acceptable loss as this area covers a small portion of the dune plume with no exposed sandstone outcrops or drainage lines. The area is largely a uniform habitat type, and development within this section will not impact the status of the vegetation/ecosystem type, red data species or influence the conservation targets set out for the CBA1 area.
- The highly sensitive southern half of the extension area, as identified in the BSA, will be formally protected by the MR Holder as a biodiversity offset area that will form part of the mine's compliance obligations.
- LA1 requires a smaller area to be rezoned from agricultural use to industrial use in terms of the municipal- and national spatial development legislation.
- Although strip mining will be implemented, extending the mining area in a north/north-western direction will lessen the visual impact on the surrounding environment according to the viewshed analysis.

ZANDBERG SAND MINE:

The negative impact associated with the current activity that was deemed to have a Medium or higher significance/risk includes:

- Natural Vegetation **Medium**

S102 APPLICATION:

The negative impacts associated with the proposed S102 Application that were deemed to have a Low-Medium or higher significance/risk includes:

- Alteration of the agricultural sense of place — **Low-Medium** (LA1); **Medium** (LA2)
- Loss of agricultural land for duration of mining — **Low-Medium** (LA1); **Low-Medium** (LA2)
- Visual intrusion as a result of mining — **Medium** (LA1); **Medium** (LA2)
- Potential impact on vegetation and listed and protected plant species — **Low-Medium** (LA1); **Low-Medium** (LA2)
- Potential impact on the CBA1 area — **Medium-High** (LA2)
- Potential impact on the local fauna due to disturbance and loss of available habitat and migration routes — **Low-Medium** (LA1); **Medium** (LA2)
- Potential impact on the drainage lines/watercourses within the mining area — **Low-Medium** (LA2)
- Dust nuisance caused by vehicles transporting the mineral — **Low-Medium** (LA1); **Low-Medium** (LA2)
- Reduced ability to meet conservation obligations and targets — **Low-Medium** (LA1); **Medium-High** (LA2); **Medium** (LA1+); **High** (LA2+)
- Impact the broad-scale ecological processes — **Low-Medium** (LA1); **Medium-High** (LA2); **Medium** (LA1+); **High** (LA2+)

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 28: 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.	⁜ Ensure no depressions are left in the mining floor to minimize the impact on drainage. Maintain a surface slope (even if minimal) across the mining floor in the drainage direction, so that all excavations are free draining. Control mining depths on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. ⁜ Control mining depths across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges. ⁜ Limit mining to the underlying sandstone layer. ⁜ Reduce any steep slopes at the edges of excavations, after mining, to a minimum and profiled it to blend with the surrounding topography. Smooth and profile the entire surface sufficiently to allow cultivation.	⁜ Effectively restoring each mined-out strip to allow the use of the area for agricultural purposes when mining ends.
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.	⁜ Ensure that the site have a neat appearance and is kept in good condition at all times. ⁜ Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. ⁜ Do concurrent rehabilitation as strip 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.	⁜ 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.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ 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.	
AIR AND NOISE QUALITY Dust Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ Control the liberation of dust into the surrounding environment by the use of; 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 haul roads to 20 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 ensure minimal spillage of material takes place during transportation, also preventing windblown dust. ⁎ Consider weather conditions upon commencement of daily operations. ⁎ 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 sand from the site to minimize potential dust impacts. ⁎ Do not use potable water for dust suppression purposes.	⁎ Dust prevention measures are applied to minimise the generation of dust.
AIR AND NOISE QUALITY Noise Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ 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.	⁎ Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ 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.	
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. ⁎ 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 on the stockpiles to prevent erosion. ⁎ Ensure that topsoil heaps do not exceed 1.5 m in order 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.	⁎ Adequate fertile topsoil is available to rehabilitate each mined-out strip.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ 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 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.	⁎ Remove soil at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. ⁎ Ensure adequate slope protection when mining within steep slopes. ⁎ Limit mining to the underlying sandstone layer. ⁎ Divert storm water around the topsoil heaps and mining areas to prevent erosion. ⁎ During mining, control the outflow of run-off water from the mining excavation to prevent down-slope erosion. If needed, construct temporary banks and ditches that will direct run-off water. These must be in place at any points where overflow out of the excavation might occur. ⁎ Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. ⁎ Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Immediately rehabilitate a finished strip with a stable vegetation cover. ⁎ Regularly monitor roads and other disturbed areas within the project area for erosion problems and conduct follow-up monitoring of problem areas to assess the success of the remediation.	⁎ Impact to the environment caused by storm water discharge is avoided and erosion is managed.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ Rectify any erosion problems within the mining area as a result of the mining activities immediately (within 24 hours) and monitor it thereafter to ensure that it does not re-occur. ⁎ Use silt/sediment traps/barriers where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. Regularly maintain and clean these sediment/silt barriers to ensure effective drainage of the areas. ⁎ Protect stockpiles from erosion, stored it on flat areas, and surround it by appropriate berms where possible. ⁎ Undertake construction of gabions and other stabilisation features to prevent erosion, where deemed necessary. ⁎ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
HYDROLOGY Management of Drainage Areas	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ Adhere to the layout of LA1, as proposed in this document, with the southern part of the proposed extension area (including all drainage areas) regarded as a no-go area and treated as a Biodiversity Offset Area. ⁎ Demarcate a 100 m buffer area from the most northern drainage line and manage it as part of the abovementioned no-go area where no mining can take place.	⁎ Drainage areas protected from any impact as a result of mining.
MINING, BIODIVERSITY CONSERVATION AREAS AND VEGETATION Management of Vegetation Removal and Conservation of the CBA.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Botanist to assist with the relocation of plants of importance (when needed).	⁎ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ⁎ Adhere to the layout of LA1, as proposed in this document, with the southern part of the proposed extension area regarded as a no-go area and treated as a Biodiversity Offset Area.	⁎ Vegetation clearing is restricted to the authorised development footprint of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
	Compliance to be monitored by the Environmental Control Officer.	⁎ Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist, for species of conservation concern that would be affected. ⁎ Keep permits for the removal of protected plant species (if required) on-site and in the possession of the flora search and rescue team at all times. ⁎ Conduct a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. ⁎ Ensure that the on-site ECO provide supervision and oversee vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. ⁎ Limit clearing of vegetation to the proposed mining footprint (LA1) and associated infrastructure. Prevent clearing outside of the minimum required footprint. ⁎ Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Upon finishing a strip, immediate rehabilitate and establish a stable vegetation cover. ⁎ Keep all vehicles on demarcated roads and prevent unnecessary driving in the veld outside these areas. ⁎ Do not translocate plants or otherwise uprooted or disturbed it for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. ⁎ Do not allow fires on-site.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
MINING, BIODIVERSITY AND VEGETATION 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 to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. ⁜ 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 removal on an ongoing basis throughout the life of the mining activities. ⁜ Keep all stockpiles (topsoil & overburden) free of invasive plant species. ⁜ Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. ⁜ Control declared invader or exotic species on the rehabilitated areas.	⁜ Mining area is kept free of invasive plant species.
MINING, BIODIVERSITY AND VEGETATION Cumulative Impacts	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁜ Adhere to the layout of LA1, as proposed in this document, with the southern part of the proposed extension area regarded as a no-go area and treated as a Biodiversity Offset Area. ⁜ Keep the activity footprints of various proposed mining locations and other development proposals in the area to a minimum and encourage a stable vegetation to return during the post-operational phase. ⁜ Reduce the footprint of mining areas within sensitive habitat types as much as possible.	⁜ Mining area does not affect the conservation obligations and targets of the CBA or impact on the broad-scale ecological processes.
FAUNA Protection of Fauna	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	⁜ Ensure no fauna is caught, killed, harmed, sold or played with. ⁜ Arrange the ECO or other suitably qualified person to remove any fauna directly threatened by the operational activities to a safe location.	⁜ Disturbance to fauna is minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
	Compliance to be monitored by the Environmental Control Officer.	⁎ Conduct environmental induction with 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. ⁎ Ensure no snares are set or nests raided for eggs or young. ⁎ Ensure all vehicles adhere to a low speed limit (20 km/h) to avoid collisions with susceptible species such as snakes and tortoises. ⁎ When possible, prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ⁎ Prevent litter, food or other foreign material being thrown or left around the site. Keep such items in the site vehicles and daily remove it from the mining area.	
CULTURAL AND HERITAGE ENVIRONMENT Archaeological, Heritage and Palaeontological Aspects	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Archaeologist 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	⁎ Impact to cultural/heritage resources is avoided or at least minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		contact a professional archaeologist for an assessment of the finds who will notify the Heritage Western Cape (HWC). ▪ Work may only continue once the go-ahead was issued by HWC. ⁎ Implement the Fossil Chance Find Protocol attached as part of the HIA (Appendix J) for the duration of the operational phase.	
LAND USE Loss of agricultural land for duration of mining.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ If needed, sign mined-out/rehabilitated areas back to agricultural use once the cover crop stabilised.	⁎ Mining has the least possible impact on the operation of the property.
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 trucks. ⁎ Adhere to the DTPW conditions submitted as part of the land use application.	⁎ 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 off-site 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 in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered	⁎ Wastes are appropriately handled and safely disposed of at recognised waste facilities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		hazardous waste handling contractor. File safe disposal certificates for auditing purposes. - Provide ablution facilities in the form of a chemical toilet. Anchor the chemical toilet and arrange that it be serviced at least once a month by a registered liquid waste handling contractor for the duration of the mining activities. File the safe disposal certificates for auditing purposes. - 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, equip it with a drip tray at all times. Ensure that drip trays are used during each and every 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. Dispose of the dirty rags used to clean the drip trays as hazardous waste into a designated bin at the off-site workshop, and incorporate it into the hazardous waste removal system. - 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. File the safe disposal certificates for auditing purposes. - Obtain an oil spill kit, and train the employees in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. - 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	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. - Contain all general waste within the site vehicles and daily remove it from the mining area to the general waste storage area at the offices on the farm. Do not burn or bury general waste on the farm, but dispose of it at the Robertson landfill site. - Prevent the storage, 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. Arrange that the affected area is cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned. - Implement the use of waste registers to keep record of the waste generated and removed from the mining area. - Ensure all employees are aware of the Emergency Response Procedures attached to this document as Appendix P.	
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.	- Prevent access to the mining area by unauthorised persons as far as is reasonably practical. - Ensure adequate ablution facilities and water for human consumption are daily available on site. - Ensure sanitary facilities is located within 100 m from any point of work. - 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)

As explained under *Part A(1)(g) Motivation for preferred development footprint…* one site alternative with two layout alternatives were considered. The footprint of LA1 entails the mining of ±27 ha of the proposed ±108 ha extension area (S1), while LA2 allows for the mining of ±99 ha of the earmarked footprint. See the final site map attached as Appendix C.

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:

- A land use application in terms of Section 60 of the Langeberg Land Use Planning By-Law of 2015 (PN 264/2015) must be approved for the proposed extension of the mining area on Portion 4 of Zandberg fontein No 97.
- A land development application in terms of the Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013) must be approved for the proposed extension of the mining area on Portion 4 of Zandberg fontein No 97.

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 MR Holder, 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.

Zandberg Sand Mine has been operational for 26 years and this report accompanies a Section 102 amendment application to expand the existing mining boundaries. Should the MR Holder commit to LA1 and the mitigation measures and monitoring programmes proposed in this document be implemented, 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* were included into the compilation of the EMPr, and should be considered for approval by the competent authority.

(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 M, 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 (at least until 2047).

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 annual amount required to manage and rehabilitate the environment was estimated to be R 310 000. Please see the explanation as to how this amount was derived at attached as Appendix N – Financial and Technical Ability.

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).

Zandberg Sandput (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 Ability attached as Appendix N 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. However, the small scale of the proposed operation (±0.5 ha affected at a time), proposed progressive rehabilitation, as well as the fact that no infrastructure will be established assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine and therefore this impact is deemed to be of medium significance.

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

  Dust may be generated as a result of the sand mining operation. The mine also contributes the noise of one FEL and ±10 trucks per day to the receiving environment. The proposed expansion of the mining footprint will take place as the current mining area is mined-out and therefore this application does not entail an additional impact but merely the continuation of the status quo. The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

(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 proposed extension 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 site alternatives associated with the proposed extension of the mining area, 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. As discussed earlier the following alternatives were considered:

1. Site Alternative 1 – Extension of the approved mining footprint with 108.3851 ha over Portion 4 of the farm Zandberg fontein No 97.

2. Layout Alternative 1 – Mining of an approximate area of ±27 ha within the proposed ±108 ha extension area, while the remaining area is protected as a no-go area.

3. Layout Alternative 2 – Mining of ±99 ha between the identified drainage lines within the proposed ±108 ha extension area.

4. No-go Alternative – No change to the *status quo.*

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 S 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 period 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 temporary 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.
- 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 mine site.

The site-specific closure objectives are discussed in detail in the attached Closure Plan (Appendix M), however, a summary of the closure objectives for the Zandberg Sand Mine were included below.

The decommissioning phase will entail the rehabilitation of the final mined-out strip and the removal of the FEL from the mining footprint. The MR Holder proposes the following regarding the rehabilitation of the mined-out strips:

- The mining plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating different mining blocks progressively as mining continues.
- To ensure minimum impact on drainage, the applicant will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- 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 entire mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying soil. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- The MR Holder 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 will be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion.
- The rehabilitated area will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- The MR Holder will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated areas. The invasive plant species management plan (Appendix K) will constantly be implemented on site

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

Rehabilitation of the excavated area:

- No waste may be permitted to be deposited in the mining area.
- 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 in order 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 (DMRE) 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.

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 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).

Control of invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area. Site management must implement an invasive plant species management plan (see Appendix K) during the 12 months' aftercare period to address germination of problem plants in the area.

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 sand mining operation, it is believed that the risk of environmental damage or pollution is of low 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.

All employees must be trained in the Emergency Response Procedures attached to this document as Appendix P.

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 – 1.2.6 Water Management*, the sand mine does not require processing water and due to the nature of the sand being mined (heavy), very little to no water is needed as dust levels are typically low. Dust generated on the access road is, as far as possible, managed through alternative dust suppression methods to minimise water use. The FEL operator, daily, brings his own potable water to site. No potable water will be used for dust suppression purposes.

viii) Has a water use license been applied for?

In 2016, the MR Holder applied for water use authorisation for activities that trigger Section 21 (c) and 21(i) of the NWA, 1998 as the mining footprint is within 500 m of a wetland. DWS issued the General Authorisation in September 2017 and the Water Certificate was received in 2018. The S102 application does not require an additional water use authorisation if LA1 is implemented.

ix) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

Table 29: Impact to be mitigated in their respective phases

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
(as listed in 2.11.1)	of operation in which activity will take place. State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure	(volumes, tonnages and hectares or m^2)	(describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)	(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)	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.
APPROVED ZANDBERG SAND MINE					
Sand Mining.	Operational Phase	±17.6826 ha	⁎ Dust suppression must be active in order to prevent dust pollution. ⁎ No open fires may be allowed on the site. ⁎ Alien vegetation needs to be eradicated. ⁎ Topsoil management and re-use must be a priority. ⁎ Rehabilitation must occur concurrent to progress of the mining.	⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ National Dust Control Regulations, GN No R827 ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ NEMA, 1998 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix M)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SECTION 102 APPLICATION					
⁎ Demarcation of site with visible beacons.	Site Establishment phase	108.3851 ha (S102 extension footprint) ±27 ha (LA1) ±99 ha (LA2)	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.
⁎ Stripping and stockpiling of topsoil.	Site Establishment- & Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**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-out/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 M)	Throughout the site establishment- and operational phases.
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- & Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**Visual Mitigation:** ⁎ The site must have a neat appearance and be kept in good condition at all times. ⁎ Mining equipment (FEL) must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use. ⁎ Concurrent rehabilitation must be done as strip 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	Management of the mining activities must be in accordance with the: ⁎ MPRDA, 2002 ⁎ NEMA, 1998	Throughout the site establishment- and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			immediately prior to the mining/use of a specific area. ℵ 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.		
ℵ Stripping and stockpiling of topsoil.	Site Establishment- & Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**Management of vegetation Removal and Conservation of the CBA:** ℵ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area. ℵ The MR Holder must adhere to the layout of LA1, as proposed in this document, with the southern part (±81 ha) of the proposed extension area regarded as a no-go area (as indicated in the Site Activities Map attached as Appendix C) and treated as a Biodiversity Offset Area. ℵ A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist, for species of conservation concern that would be affected (also to comply with the Western Cape Nature Conservation Ordinance and DEA&DP permit conditions). ℵ Permits for the removal of protected plant species (if required) must be kept on-site and in the possession of the flora search and rescue team at all times. ℵ A pre-commencement environmental induction for all staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering,	Natural vegetated areas must be managed in accordance with the: ℵ NEM:BA 2004 ℵ Western Cape Biodiversity Spatial Plan	Throughout the site establishment- and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. - The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. - Clearing of vegetation must be limited to the proposed mining footprint (LA1) and associated infrastructure. No clearing outside of the minimum required footprint to take place. - Phased mining and vegetation clearance must be done, wherein small strips are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation should occur wherein a stable vegetation cover is established with a grass cover. - All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed. - No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. - No fires must be allowed on-site.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Stripping and stockpiling of topsoil.	Site Establishment, Operational- and Decommissioning Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**<u>Topsoil Management:</u>** ⁎ The upper 300 mm of the soil, of the strip to be mined, 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 of plants on the stockpiles will help to prevent erosion. ⁎ Topsoil heaps may not exceed 1.5 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.	Topsoil stripping must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix M) ⁎ Western Cape Noise Control Regulations (PN 200/2013), June 2013	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 stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site. ⁎ The MR holder 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.		
⁎ Stripping and stockpiling of topsoil. ⁎ Sloping and landscaping	Site Establishment & Operational-, and Decommissioning Phase	±27 ha (LA1) ±99 ha (LA2)	**<u>Management of Invader Plant Species:</u>** ⁎ An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all	Invader plants must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA 2004	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
(medium- & long term).		±0.25 ha/strip	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. ℵ All stockpiles (topsoil) must be kept free of invasive plant species. ℵ No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed. ℵ 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) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.	ℵ Invasive Plant Species Management Plan (Appendix K)	
ℵ Stripping and stockpiling of topsoil. ℵ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment & Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**<u>Protection of Fauna:</u>** ℵ The site manager must ensure no fauna is caught, killed, harmed, sold or played with. ℵ Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person.	Fauna must be managed in accordance with the: ℵ 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
			⁎ 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 (20 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. ⁎ When possible, no activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ⁎ No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed from the mining area.		
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Transporting of mineral.	Site Establishment- & Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**Dust Mitigation:** ⁎ 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	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
			to confirm its effectiveness in addressing dust suppression. - Speed on the access road must be limited to 20 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 the site to minimize potential dust impacts. - No potable water may be used for dust suppression purposes.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- and, Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**Noise Handling:** ⁎ The MR holder 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 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.	Noise generation must be managed in accordance with the: ⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ NRTA, 1996 ⁎ Western Cape Noise Control Regulations (PN 200/2013), June 2013	Throughout the site establishment-, and operational phase.
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- and, Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**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	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
			extent of the find, and confirm the extent of the work stoppage in that area. ℵ 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 Heritage Western Cape (HWC). ℵ Work may only continue once the go-ahead was issued by HWC. ℵ The Fossil Chance Find Protocol attached as part of the HIA (Appendix J) must be implemented for the duration of the operational phase.		
ℵ Stripping and stockpiling of topsoil.	Site Establishment- and, Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**<u>Mitigating the Impact on the Drainage Areas:</u>** ℵ The MR Holder must adhere to the layout of LA1, as proposed in this document, with the southern part (±81 ha) of the proposed extension area (including all drainage areas) regarded as a no-go area (as indicated in the Site Activities Map attached as Appendix C) and treated as a Biodiversity Offset Area. ℵ The MR Holder must demarcate a 100 m buffer area from the most northern drainage line and manage it as part of the abovementioned no-go area where no mining can take place.	The drainage lines must be protected in accordance with the: ℵ NWA, 1998	Throughout the site establishment-, and operational phase.
ℵ Excavation of sand from the mining footprint and	Operational-, and Decommissioning Phase	±27 ha (LA1) ±99 ha (LA2)	**<u>Landscaping of Mining Area:</u>** ℵ To ensure minimum impact on drainage, it is essential that no depressions are left in the	Management of the mining area must be in accordance with the: ℵ CARA, 1983	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
loading onto trucks. - Sloping and landscaping (medium- & long term).		±0.25 ha/strip	mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining depths must be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. - Mining depths must be controlled across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges. - No mining may extend into/below the underlying sandstone layer. - After mining, any steep slopes at the edges of excavations must be reduced to a minimum and profiled to blend with the surrounding topography. The entire surface must be sufficiently smoothed and profiled to allow cultivation.	- NEM:BA, 2004 - MPRDA, 2002 - Closure Plan (Appendix M)	
- Excavation of sand from the mining footprint and loading onto trucks. - Sloping and landscapting (medium- & long terrm).	Operational-, and Decommissioning Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**Waste Management:** - Regular vehicle maintenance, repairs and services may only take place at the off-site 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 (off-site) in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a	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
			registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes. - Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored (to prevent blowing/falling over) and shall be serviced at least once a month for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes. - The use of any temporary, chemical toilet 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 temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the MR holder. - 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. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the off-site workshop, where it is incorporated into the hazardous waste removal system as discussed above.		

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. The safe disposal certificates must be filed for auditing purposes. ⁎ An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. ⁎ 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 from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed. ⁎ All general waste must be contained within the site vehicles and daily be removed from the mining area to the general waste storage area at the offices on the farm. No general waste may be burned or buried on the farm, but must be disposed of at the Robertson landfill site. ⁎ No waste may be stored, 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. The affected area must be cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			⁎ Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area. ⁎ All employees must be aware of the Emergency Response Procedures attached to this document as Appendix J.		
⁎ Transporting of mineral.	Operational Phase	±1 km	**Access Road Mitigation:** ⁎ Storm water must be diverted around the access road to prevent erosion. ⁎ Vehicular movement must be restricted to the existing access road 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 MR Holder. ⁎ Overloading of the trucks must be prevented. ⁎ The MR Holder must adhere to the DTPW conditions submitted as part of the land use application.	The access road must be managed in accordance with the: ⁎ NRTA, 1996	Throughout the operational phase.
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site establishment-, Operational- and Decommissioning Phase.	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**Erosion Control and Storm Water Mitigation:** ⁎ Soil that are to be removed must be done so at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. ⁎ When mining within steep slopes, it must be ensured that adequate slope protection is provided. ⁎ No mining may extend into/below the underlying sandstone layer.	Storm water must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEMA, 1998 ⁎ NWA, 1998	Throughout the site establishment-, operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Sloping and landscaping during rehabilitation.			⁎ Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion. ⁎ During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur. ⁎ Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place. ⁎ Phased mining and vegetation clearance must be done, wherein small strips are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation must occur wherein a stable vegetation cover is established with a grass cover. ⁎ Roads and other disturbed areas within the project area must be regularly monitored for erosion problems and problem areas must receive follow-up monitoring to assess the success of the remediation. ⁎ Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 24 hours) and monitored thereafter to ensure that it does not re-occur.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			⁜ Silt/sediment traps/barriers must be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. These sediment/silt barriers must regularly be maintained and cleared so as to ensure effective drainage of the areas. ⁜ Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms. ⁜ Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary. ⁜ 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		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			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.		
⁎ Cumulative Impacts.	Site Establishment Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**<u>Cumulative Impacts - Ecological:</u>** ⁎ The MR Holder must adhere to the layout of LA1, as proposed in this document, with the southern part (±81 ha) of the proposed extension area regarded as a no-go area (as indicated in the Site Activities Map attached as Appendix C) and treated as a Biodiversity Offset Area. ⁎ The activity footprints of various proposed mining locations and other development proposals in the area must be kept to a minimum and a stable vegetation must be encouraged to return during the post-operational phase. ⁎ The footprint of mining areas within sensitive habitat types must be reduced as much as possible.	Management of the mining area must be in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan	Throughout the operational-, and decommissioning phase.
⁎ Cumulative Impacts	Operational Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**<u>Cumulative Impacts - Palaeontological:</u>** ⁎ The MR Holder must implement a Fossil Chance Find Protocol in the EMPR (see HIA for the protocol).	Management of the mining area must be in accordance with the: ⁎ NHRA, 1999 ⁎ Fossil Chance Find Protocol	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Stipping and stockpiling of topsoil. ⁎ Excavation of sand rom the mining footprint and loading onto trucks. ⁎ Transporting of material. ⁎ Sloping and landscaping.	Site Establishment-, Operational- and Decommissioning Phase	±27 ha (LA1) ±99 ha (LA2) ±0.25 ha/strip	**<u>Management of Health and Safety Risks:</u>** ⁎ Access to the mining area by unauthorised persons is to be prevented by the Mine Manager, as far as is reasonably practical. ⁎ Adequate ablution facilities and water for human consumption must daily be available on site. ⁎ Sanitary facilities must be located within 100 m from any point of work. ⁎ 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).	Management of the mining activity must be in accordance with the: ⁎ MHSA, 1996	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 30: 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.
APPROVED ZANDBERG SAND MINE					
Sand mining.	⁜ Impact on the physical and chemical components.	⁜ Geology. ⁜ Air Quality – Dust. ⁜ Air Quality – Emissions. ⁜ Groundwater. ⁜ Visual Aspects. ⁜ Topography.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ NEM:AQA. 2004 Regulation 6(1) ⁜ National Dust Control Regulations, GN No R827 ⁜ NWA, 1998
Sand mining.	⁜ Impact on the biological and ecological components.	⁜ Natural Vegetation. ⁜ Soils.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ NEMA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
		⁜ Sensitive Landscapes. ⁜ Land Use. ⁜ Land Capability. ⁜ Animal Life.			⁜ MPRDA, 2002
Sand mining.	⁜ Impact on sociological and cultural components.	⁜ Interested and Affected Parties. ⁜ Archaeological Artefacts. ⁜ Noise.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ NEMA, 1998 ⁜ NHRA, 1999 ⁜ NEM:AQA. 2004 Regulation 6(1)
Sand mining.	⁜ Impact on economical and operational components.	⁜ Regional Socio Economic Structure.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ MPRDA, 2002 ⁜ NEMA, 1998
S102 APPLICATION					
⁜ 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	Control: Implementation of proper housekeeping and site management.	Mining is only allowed within the boundaries of the approved area. ⁜ MPRDA, 2002 ⁜ NEMA, 1998
⁜ Stripping and stockpiling of topsoil.	⁜ Alteration of the agricultural sense of place.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	The study area does not have a high agritourism potential, and the sand mine has a low visibility. The significance is therefore deemed to be low-medium (LA1) during the	Use of agricultural land must be managed in accordance with the: ⁜ CARA, 1983

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				operational phase and negligible upon the closure of the mine.	⁜ Closure Plan (Appendix M)
⁜ Stripping and stockpiling of topsoil.	⁜ Loss of agricultural land for duration of mining.	The impact affects 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 M)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of the mineral.	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
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on vegetation and listed and protected plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Natural vegetated areas must be managed in accordance with the: ⁜ NEM:BA 2004 ⁜ Western Cape Biodiversity Spatial Plan
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on the CBA1 area.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Natural vegetated areas must be managed in accordance with the: ⁜ NEM:BA 2004 ⁜ Western Cape Biodiversity Spatial Plan
⁜ Stripping and stockpiling of topsoil.	⁜ Loss of topsoil and fertility during mining and stockpiling.	Loss of topsoil will affect the rehabilitation	Site Establishment, Operational- and	Control & Remedy: Proper housekeeping and storm water management.	Topsoil stripping must be managed in accordance with the:

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Potential erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion. ⁜ Erosion of returned topsoil after rehabilitation.	success upon closure of the mine.	Decommissioning Phase		⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix M) ⁜ Western Cape Noise Control Regulations (PN 200/2013), June 2013
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (medium- & long term).	⁜ Infestation of the topsoil heaps and mining area 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 K)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on local fauna due to disturbance and loss of available habitat and migration routes.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	Control & Stop: Implementing good management practices.	Fauna must be managed in accordance with the: ⁜ NEM:BA 2004

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	⁜ Disturbance to fauna within the footprint area.				
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of mineral.	⁜ Dust nuisance as a result of the mining activities. ⁜ Dust nuisance caused by vehicles transporting the mineral.	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)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Noise nuisance as a result of the mining activities. ⁜ Noise nuisance as result of the mining 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 ⁜ Western Cape Noise Control Regulations (PN 200/2013), June 2013
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeonological concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment- and, Operational Phase	Control & Stop: Implementation of a chance-find procedure.	Cultural/heritage aspects must be managed in accordance with the: ⁜ NHRA, 1999

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on the drainage lines/watercourses within the mining area.	This impact could affect the hydrology of the surrounding environment.	Site Establishment- and, Operational Phase	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	The drainage lines must be protected in accordance with the: ⁜ NWA, 1998
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Creating steep slopes and uneven surfaces. ⁜ Uneven surfaces or steep slopes left upon closure of the site.	The impact will prevent or hinder future cultivation.	Operational-, and Decommissioning Phase	Control: Effective rehabilitation according to the closure plan.	Management of the mining area must be in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix M)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscapting (medium- & long terrm).	⁜ Soil contamination from hydrocarbon spills. ⁜ Potential impact associated with littering at the mining area. ⁜ Potential impact associated with litter 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	Control & Remedy: Proper housekeeping and implementation of the emergency response procedures and waste management registers.	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)
⁜ Transporting of mineral.	⁜ Degradation of the access roads.	Collapse of the internal road infrastructure will affect the landowner negatively, and if the	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.	The access road must be managed in accordance with the: ⁜ NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	⁜ Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	mine negatively affect public traffic it may incur additional costs and complaints from the public.			
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	The cumulative impacts must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ Closure Plan
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	The cumulative impacts must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ Closure Plan
⁜ Cumulative Impacts	⁜ Cumulative impact of projects on palaeontological resources.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	Control & Stop: Implementation of a chance-find procedure.	Management of the mining area must be in accordance with the: ⁜ NHRA, 1999 ⁜ Fossil Chance Find Protocol

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 31: Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
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..)	(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.	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.	(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)
APPROVED ZANDBERG SAND MINE				
Sand mining.	⁎ Impact on the physical and chemical components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ National Dust Control Regulations, GN No R827 ⁎ NWA, 1998
Sand mining.	⁎ Impact on the biological and ecological components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ NEMA, 1998 ⁎ MPRDA, 2002

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Sand mining.	⁜ Impact on sociological and cultural components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁜ NEMA, 1998 ⁜ NHRA, 1999 ⁜ NEM:AQA. 2004 Regulation 6(1)
Sand mining.	⁜ Impact on economical and operational components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁜ MPRDA, 2002 ⁜ NEMA, 1998
S102 APPLICATION				
⁜ 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
⁜ Stripping and stockpiling of topsoil.	⁜ Alteration of the agricultural sense of place.	The study area does not have a high agritourism potential, and the sand mine has a low visibility. The significance is therefore deemed to be low-medium (LA1) during the operational phase and negligible upon the closure of the mine.	Throughout the site establishment- and operational phases.	Use of agricultural land must be managed in accordance with the: ⁜ CARA, 1983 ⁜ Closure Plan (Appendix M)
⁜ Stripping and stockpiling of topsoil.	⁜ 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.	Throughout the site establishment phase.	Use of agricultural land must be managed in accordance with the: ⁜ CARA, 1983 ⁜ Closure Plan (Appendix M)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	⁎ Visual intrusion as a result of mining. ⁎ Visual intrusion associated with the extraction of the mineral.	Control: Proper housekeeping and implementation of progressive rehabilitation.	Throughout the site establishment, and operational phase.	Management of the mining activities must be in accordance with the: ⁎ MPRDA, 2002 ⁎ NEMA, 1998
⁎ Stripping and stockpiling of topsoil.	⁎ Potential impact on vegetation and listed and protected plant species.	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Throughout the site establishment-, and operational phase.	Natural vegetated areas must be managed in accordance with the: ⁎ NEM:BA 2004 ⁎ Western Cape Biodiversity Spatial Plan
⁎ Stripping and stockpiling of topsoil.	⁎ Potential impact on the CBA1 area.	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Throughout the site establishment-, and operational phase.	Natural vegetated areas must be managed in accordance with the: ⁎ NEM:BA 2004 ⁎ Western Cape Biodiversity Spatial Plan
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Sloping and landscaping (medium- & long term).	⁎ Loss of topsoil and fertility during mining and stockpiling. ⁎ Potential erosion risk and destabilisation of the dune plume. ⁎ Facilitation of erosion. ⁎ Erosion of returned topsoil after rehabilitation.	Control & Remedy: Proper housekeeping and storm water management.	Throughout the site establishment-, and operational phase.	Topsoil stripping must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix M) ⁎ Western Cape Noise Control Regulations (PN 200/2013), June 2013

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
⁎ Stripping and stockpiling of topsoil. ⁎ Sloping and landscaping (medium- & long term).	⁎ Infestation of the topsoil heaps and mining area with invader plant species. ⁎ Infestation of the reinstated area with invader plant species.	Control: Implementing soil- and invader plant control/management.	Throughout the 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 K)
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	⁎ Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. ⁎ Disturbance to fauna within the footprint area.	Control & Stop: Implementing good management practices.	Throughout the site establishment-, and operational phase.	Fauna must be managed in accordance with the: ⁎ NEM:BA 2004
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Transporting of mineral.	⁎ Dust nuisance as a result of the mining activities. ⁎ Dust nuisance caused by vehicles transporting the mineral.	Control: Dust suppression methods and proper housekeeping.	Throughout the site establishment-, and 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)
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	⁎ Noise nuisance as a result of the mining activities. ⁎ Noise nuisance as result of the mining activities.	Control: Noise suppression methods and proper housekeeping.	Throughout the site establishment-, and operational phase.	Noise generation must be managed in accordance with the: ⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				⁎ Western Cape Noise Control Regulations (PN 200/2013), June 2013
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	⁎ Potential impact on archaeological artefacts. ⁎ Potential impact on areas of palaeonological concern.	Control & Stop: Implementation of a chance-find procedure.	Throughout the site establishment-, and operational phase.	Cultural/heritage aspects must be managed in accordance with the: ⁎ NHRA, 1999
⁎ Stripping and stockpiling of topsoil.	⁎ Potential impact on the drainage lines/watercourses within the mining area.	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Throughout the site establishment-, and operational phase.	The drainage lines must be protected in accordance with the: ⁎ NWA, 1998
⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Sloping and landscaping (medium- & long term).	⁎ Creating steep slopes and uneven surfaces. ⁎ Uneven surfaces or steep slopes left upon closure of the site.	Control: Effective rehabilitation according to the closure plan.	Throughout the operational-, and decommissioning phase.	Management of the mining area must be in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix M)
⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Sloping and landscapting (medium- & long terrm).	⁎ Soil contamination from hydrocarbon spills. ⁎ Potential impact associated with littering at the mining area. ⁎ Potential impact associated with litter left at the mining area.	Control & Remedy: Proper housekeeping and implementation of the emergency response procedures and waste management registers.	Throughout operational and decommissioning phases.	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)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
⁎ Transporting of mineral.	⁎ Degradation of the access roads. ⁎ Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	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.	Throughout the operational phase.	The access road must be managed in accordance with the: ⁎ NRTA, 1996
⁎ Cumulative Impacts	⁎ Reduced ability to meet conservation obligations and targets.	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Throughout the decommissioning phase.	The cumulative impacts must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ Closure Plan
⁎ Cumulative Impacts	⁎ Impact the broad-scale ecological processes.	Modify & Control: Implementing LA1 instead of LA2, and keeping mining operations to the approved boundaries.	Throughout the decommissioning phase.	The cumulative impacts must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ Closure Plan
⁎ Cumulative Impacts	⁎ Cumulative impact of projects on palaeontological resources.	Control & Stop: Implementation of a chance-find procedure.	Throughout the operational phase.	Management of the mining area must be in accordance with the: ⁎ NHRA, 1999 ⁎ Fossil Chance Find Protocol

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 preferred post-mining land use for the Zandberg Sand Mine is to restore the indigenous vegetation and return the zoning to Agriculture.

As a strip is mined-out the area will be rehabilitated as mining progress into the consecutive strip, with no more than two strips open at any given time. The stockpiled topsoil will be spread over the mined area to a depth of at least 300 mm.

Final rehabilitation will entail the removal of all equipment from the site. Final landscaping, levelling and top dressing will be done on all areas. Site management will implement an invasive plant species management plan (see Appendix K) during the 12 months' aftercare period to address germination of problem plants in the area. The MR Holder 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 draft EIAR & EMPr, includes all the environmental objectives in relation to closure and will be available for perusal by the landowner, I&AP's and stakeholders over a 30-days commenting period. The comments received on the draft EIAR will be 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 Zandberg sand mining footprint. 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:

- No waste may be permitted to be deposited in the mining area.
- 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 in order 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 (DMRE) 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.

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 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. The following calculation includes both the footprint of the approved Zandberg Sand Mine and the proposed extension area.

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	-	NO
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 2020 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	-	-
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	-	-

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
6	Opencast rehabilitation including final voids and ramps	253 019	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	-	-
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	17 782	1.00

Determine weighting factors

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.10 (Undulating)
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 32: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	**Zandberg Sand Mine**			**Location:**	**Robertson**		
Evaluators:	**C Fouché**			**Date:**	**02 September 2020**		
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	17	1.00	1.10	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	241	1.00	1.10	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	356	1.00	1.10	R 0.00
3	Rehabilitation of access roads	m^2	0	43	1.00	1.10	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	419	1.00	1.10	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	229	1.00	1.10	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	483	1.00	1.10	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	0.5	253 019	0.04	1.10	R 5 566.42
7	Sealing of shaft, audits and inclines	m^3	0	130	1.00	1.10	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	168 679	1.00	1.10	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	210 087	1.00	1.10	R 0.00

8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	610 192	0.51	1.10	R 0.00
9	Rehabilitation of subsided areas	ha	0	141 244	1.00	1.10	R 0.00
10	General surface rehabilitation	ha	0	133 622	1.00	1.10	R 0.00
11	River diversions	ha	0	133 622	1.00	1.10	R 0.00
12	Fencing	m	0	152	1.00	1.10	R 0.00
13	Water Management	ha	0	50 807	0.17	1.10	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	2	17 782	1.00	1.10	R 39 120.40
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 44 686.82
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 44 686.82		**Sub Total 1**	R 46 921.16

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 2 815.27
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R 4 692.12
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 54 428.54
		Vat (15%)	R 8 164.28
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 62 592.83**

The amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 62 592.83. The MR Holder currently has a financial guarantee to the value of R 110 000 lodged with the DMRE.

(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 33: 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 the mining area.	<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 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
⁜ Stripping and stockpiling of topsoil.	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-out/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.
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	Visual Characteristics ⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of material.	⁜ Minimize the visual impact of the activity on the surrounding environment through proper site management and implementing 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: ⁜ Ensure that the site have a neat appearance and is kept in good condition at all times. ⁜ Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. ⁜ Do concurrent rehabilitation as strip 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.	
⁜ Stripping and stockpiling of topsoil.	<u>Mining, Biodiversity Conservation Areas and Vegetation</u> ⁜ Potential impact on vegetation and listed and ptorected plant species. ⁜ Potnetial impact on the CBA1 area.	⁜ Visible beacons indicating the boundary of the mineable area (LA1). ⁜ Pre-commencement walkthrough with botanist. ⁜ Removal permit should protected or red data species be relocated. ⁜ Cover crop to seed reinstated 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> ⁜ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ⁜ Adhere to the layout of LA1, as proposed in this document, with the southern part of the proposed extension area regarded as a no-go area and treated as a Biodiversity Offset Area. ⁜ Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist, for species of conservation concern that would be affected. ⁜ Keep permits for the removal of protected plant species (if required) on-site and in the possession of the flora search and rescue team at all times. ⁜ Conduct a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. ⁜ Ensure that the on-site ECO provide supervision and oversee vegetation clearing activities and other activities which may	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
			cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. - Limit clearing of vegetation to the proposed mining footprint (LA1) and associated infrastructure. Prevent clearing outside of the minimum required footprint. - Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Upon finishing a strip, immediate rehabilitate and establish a stable vegetation cover. - Keep all vehicles on demarcated roads and prevent unnecessary driving in the veld outside these areas. - Do not translocate plants or otherwise uprooted or disturbed it for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. - Do not allow fires on-site.	
- Stripping and stockpiling of topsoil.	<u>Geology and Soil:</u> - Loss of topsoil and fertility during mining and stockpiling.	- Earthmoving equipment to reinstate mined-out areas. - Cover crop to be established on reinstated areas. - Erosion control infrastructure (if necessary).	<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> - Strip and stockpile the upper 300 mm of the soil before mining. - Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process.	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
			⁜ 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 on the stockpiles to prevent erosion. ⁜ Ensure that topsoil heaps do not exceed 1.5 m in order 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.	

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
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (Medium- & long term).	Hydrology: ⁜ Potential increased erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion. ⁜ Erosion of returned topsoil after rehabiliation.	⁜ Earthmoving equipment to reinstate mined-out areas. ⁜ Cover crop to be established on reinstated areas. ⁜ Erosion control infrastructure (if necessary).	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: ⁜ Remove soil at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. ⁜ Ensure adequate slope protection when mining within steep slopes. ⁜ Limit mining to the underlying sandstone layer. ⁜ Divert storm water around the topsoil heaps and mining areas to prevent erosion. ⁜ During mining, control the outflow of run-off water from the mining excavation to prevent down-slope erosion. If needed, construct temporary banks and ditches that will direct run-off water. These must be in place at any points where overflow out of the excavation might occur. ⁜ Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. ⁜ Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Immediately rehabilitate a finished strip with a stable vegetation cover. ⁜ Regularly monitor roads and other disturbed areas within the project area for erosion problems and conduct follow-up	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
			monitoring of problem areas to assess the success of the remediation. ⁜ Rectify any erosion problems within the mining area as a result of the mining activities immediately (within 24 hours) and monitor it thereafter to ensure that it does not re-occur. ⁜ Use silt/sediment traps/barriers where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. Regularly maintain and clean these sediment/silt barriers to ensure effective drainage of the areas. ⁜ Protect stockpiles from erosion, stored it on flat areas, and surround it by appropriate berms where possible. ⁜ Undertake construction of gabions and other stabilisation features to prevent erosion, where deemed necessary. ⁜ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (Medium- & Long Term).	<u>Mining, Biodiviersity and Vegetation:</u> ⁜ Infestation of the topsoil heaps and mining area with invader plant species. ⁜ Infestation of the reinstated area with invader plant species.	⁜ Designated team to cut or pull out invasive plant species that germinated on site. ⁜ Herbicide application equipment.	<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 to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. ⁜ 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	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
			NEM:BA, 2004. Do weed/alien clearing on an ongoing basis throughout the life of the mining activities. - Keep all stockpiles (topsoil & overburden) free of invasive plant species. - Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. - Control declared invader or exotic species on the rehabilitated areas.	
- Strippping and stockpiling of topsoil. - Excavation of sand from the mining footprint and loading onto trucks.	<u>Fauna:</u> - Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. - Disturbance to fauna within the footprint area.	- Toolbox talks to educate employees how to handle fauna that enter the work 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> - Ensure no fauna is caught, killed, harmed, sold or played with. - Arrange the ECO or other suitably qualified person to remove any fauna directly threatened by the operational activities to a safe location. - Conduct environmental induction with 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. - Ensure no snares are set or nests raided for eggs or young. - Ensure all vehicles adhere to a low speed limit (20 km/h) to avoid collisions with susceptible species such as snakes and tortoises.	Applicable throughout site establishment-, and operational phases. - Daily compliance monitoring by site management. - Annual compliance monitoring of site by an Environmental Control Officer.

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			⁜ When possible, prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ⁜ Prevent litter, food or other foreign material being thrown or left around the site. Keep such items in the site vehicles and daily remove it from the mining area.	
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of material.	<u>Air and Noise Quality:</u> ⁜ Dust nuisance as a result of the mining activities. ⁜ Dust nuisance as a result of the mining actvities. ⁜ Dust nuisance caused by vehicles transporting the material.	⁜ Dust suppression equipment such as a water car. ⁜ Signage that clearly reduce the speed on the access roads.	<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 by the use of; 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 haul roads to 20 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 ensure minimal spillage of material takes place during transportation, also preventing windblown dust. ⁜ Consider weather conditions upon commencement of daily operations.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Annual compliance monitoring of site by an Environmental Control Officer.

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			⁜ 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 sand from the site to minimize potential dust impacts. ⁜ Do not use potable water for dust suppression purposes.	
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	<u>Air and Noise Quality:</u> ⁜ Noise nuisance as a result of the mining 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.	<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.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Annual compliance monitoring of site by an Environmental Control Officer.
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining	<u>Cultural and Heritage Environment:</u>	⁜ Contact number of an archaeologist & palaeontologist that can be contacted	<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.	Applicable throughout site establishment-, operational-, and decommissioning phases.

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footprint and loading onto trucks.	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeontological concern.	when a discovery is made on site.	<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 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 Heritage Western Cape (HWC). ▪ Work may only continue once the go-ahead was issued by HWC.	⁜ Daily compliance monitoring by site management. ⁜ Annual compliance monitoring of site by an Environmental Control Officer.
⁜ Stripping and stockpiling of topsoil.	<u>Hydrology:</u> ⁜ Potential impact on the drainage lines/watercourses within the mining area.	⁜ Visible beacons indicating the boundary of the mineable area (LA1) and the start of the 100 m buffer zone.	<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.	Throughout the site establishment-, and operational phase. ⁜ Daily compliance monitoring by site management. ⁜ Annual compliance monitoring of site by an Environmental Control Officer.

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			Responsibility: • Adhere to the layout of LA1, as proposed in this document, with the southern part of the proposed extension area (including all drainage areas) regarded as a no-go area and treated as a Biodiversity Offset Area. • Demarcate a 100 m buffer area from the most northern drainage line and manage it as part of the abovementioned no-go area where no mining can take place	
• Excavation of sand from the mining footprint and loading onto trucks. • Sloping and landscaping (Medium- & Long Term)	Topography: • Creating steep slopes and uneven surfaces. • Uneven surfaces or steep slopes left upon closure of the site.	• Earthmoving equipment to reinstate mined-out 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: • Ensure no depressions are left in the mining floor to minimize the impact on drainage. Maintain a surface slope (even if minimal) across the mining floor in the drainage direction, so that all excavations are free draining. Control mining depths on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. • Control mining depths across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges. • Limit mining to the underlying sandstone layer. • Reduce any steep slopes at the edges of excavations, after mining, to a minimum and profiled it to blend with the	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
			surrounding topography. Smooth and profile the entire surface sufficiently to allow cultivation.	
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping during rehabilitation (Medium- & Long Term).	<u>General</u> ⁜ Soil contamination from hydrocabon spills. ⁜ Potential impact associated with littering at the mining area. ⁜ Potential impact assicated with litter left at the mining area.	⁜ Sealed drip trays. ⁜ Formal waste disposal system with waste registers.	<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 off-site 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 in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. ⁜ Provide ablution facilities in the form of a chemical toilet. Anchor the chemical toilet and arrange that it be serviced at least once a month by a registered liquid waste handling contractor for the duration of the mining activities. File the safe disposal certificates for auditing purposes. ⁜ 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.	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
			⁎ If a diesel bowser is used on site, equip it with a drip tray at all times. Ensure that drip trays are used during each and every 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. Dispose of the dirty rags used to clean the drip trays as hazardous waste into a designated bin at the off-site workshop, and incorporate it into the hazardous waste removal system. ⁎ 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. File the safe disposal certificates for auditing purposes. ⁎ Obtain an oil spill kit, and train the employees in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. ⁎ 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. ⁎ Contain all general waste within the site vehicles and daily remove it from the mining area to the general waste storage area at the offices on the farm. Do not burn or bury general waste on the farm, but dispose of it at the Robertson landfill site. ⁎ Prevent the storage, 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. Arrange that the affected area is cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned.	

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			⁜ Implement the use of waste registers to keep record of the waste generated and removed from the mining area. ⁜ Ensure all employees are aware of the Emergency Response Procedures attached to this document as Appendix J.	
⁜ Transporting of material.	Existing Infrastructure: ⁜ Deterioration of the access roads. ⁜ Traffiic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	⁜ Grader to restore the road surface when needed.	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: ⁜ 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 trucks. ⁜ Adhere to the DTPW conditions submitted as part of the land use application.	Applicable throughout operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Annual compliance monitoring of site by an Environmental Control Officer.
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	General: ⁜ Management of Health and Safety Risks.	⁜ 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: ⁜ Prevent access to the mining area by unauthorised persons as far as is reasonably practical.	Applicable throughout decommissioning phase. ⁜ Daily compliance monitoring by site management. ⁜ Annual compliance monitoring of site by an Environmental Control Officer.

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⁜ Transporting of material ⁜ Sloping and landscaping (Medium- & Long Term)			⁜ Ensure adequate ablution facilities and water for human consumption are daily available on site. ⁜ Ensure sanitary facilities is located within 100 m from any point of work. ⁜ 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).	

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 biennially 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 Section 102 amendment application was approved, a copy of the amended EMPR will be handed to the site manager. An induction meeting will be held with the mining related employees (operator & management) to inform them of the Basic Rules of Conduct with regard to 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 EMPR document and its requirement and commitments before any mining takes place. An Environmental Control Officer needs to check compliance of the mining activities to the management programmes described in the EMPR.

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst preforming their tasks.

- **Site Management:**
  - 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 fire wood
  - 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 MR Holder 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

I, Gertrud Angela Viljoen

The undersigned and duly authorised thereto by Zandberg Sandput 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 Robertson this 25 day October 2020

GAViljoen

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 2020

REGIONAL MANAGER
WESTERN CAPE
Undertaking/eg

3. 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:

23 October 2020

Date:

-END-

APPENDIX A1

REGULATION 42 MINE PLAN

APPENDIX A2

REGULATION 2(2) MINE PLAN

APPENDIX B

LOCALITY MAP

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APPENDIX L

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 expansion of the Zandberg Sand Mine may have on the environment after the management and mitigation of impacts have been taken into account, 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
APPROVED ZANDBERG SAND MINE			
⁒ Geology	**Duration of operational phase ±27 years**	⁒ Definite	⁒ Low
⁒ Air Quality - Dust		⁒ Definite	⁒ Low
⁒ Air Quality - Emissions		⁒ Probable	⁒ Low
⁒ Groundwater		⁒ Probable	⁒ Low
⁒ Visual Aspects		⁒ Definite	⁒ Low
⁒ Surface Water		⁒ Probable	⁒ Low
⁒ Topography		⁒ Definite	⁒ Low
⁒ Natural Vegetation		⁒ Definite	⁒ Medium
⁒ Soils		⁒ Definite	⁒ Low
⁒ Sensitive Landscapes		⁒ Definite	⁒ Low
⁒ Land Use		⁒ Definite	⁒ Low
⁒ Land Capability		⁒ Definite	⁒ Low
⁒ Animal Life		⁒ Probable	⁒ Low

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
LAYOUT ALTERNATIVE 1			
Stripping and Stockpiling of Topsoil:	**Duration of operational phase ±27 years**		
⁎ Alteration of the agricultural sense of place.		**Possible**	**Low-Medium Concern**
⁎ Loss of agricultural land for duration of mining.		**Definite**	**Low-Medium Concern**
⁎ Visual intrusion as a result of mining.		**Possible**	**Medium Concern**
⁎ Potential impact on vegetation and listed and protected plant species.		**Possible**	**Low-Medium Concern**
⁎ Potential impact on the CBA1 area.		**Low Possibility**	**Low Concern**
⁎ Loss of topsoil and fertility during mining and stockpiling.		**Low Possibility**	**Low Concern**
⁎ Infestation of the topsoil heaps and mining area with invader plant species.		**Low Possibility**	**Low Concern**
⁎ Potential impact on local fauna due to disturbance and loss of available habitat and migration routes.		**Low Possibility**	**Low-Medium Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact on archaeological artefacts.		**Low Possibility**	**Low Concern**
⁎ Potential impact on the drainage lines/watercourses within the mining area.		**Low Possibility**	**Low Concern**
⁎ Potential increased erosion risk and destabilisation of the dune plume.		**Low Possibility**	**Low Concern**
Excavation of sand from the mining footprint and loading onto trucks:	**Duration of operational phase ±27 years**		
⁎ Visual intrusion associated with the excavation of the mineral.		**Definite**	**Medium Concern**
⁎ Creating steep slopes and uneven surfaces.		**Low Possibility**	**Low Concern**
⁎ Soil contamination from hydrocarbon spills.		**Low Possibility**	**Low Concern**
⁎ Disturbance to fauna within the footprint area.		**Low Possibility**	**Low Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact associated with littering at the mining area.		**Low Possibility**	**Low Concern**
⁎ Potential impact on areas of palaeontological concern.		**Low Possibility**	**Low Concern**
⁎ Facilitation of erosion.		**Low Possibility**	**Low Concern**
Transporting of Mineral:	**Duration of operational phase ±27 years**		
⁎ Dust nuisance caused by vehicles transporting the mineral.		**Low Possibility**	**Low-Medium Concern**
⁎ Degradation of the access road.		**Low Possibility**	**Low Concern**
		Low Possibility	**Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
LAYOUT ALTERNATIVE 1			
⁎ Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity.			
Cumulative Impacts: ⁎ Reduced ability to meet conservation obligations and targets (LA1) ⁎ Reduced ability to meet conservation obligations and targets (LA1+) ⁎ Impact the broad-scale ecological process (LA1) ⁎ Impact the broad-scale ecological process (LA1+) ⁎ Cumulative impact of projects on palaeontological resources (LA1)	**Duration of operational phase ±27 years**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**Low-Medium Concern** **Medium Concern** **Low-Medium Concern** **Medium Concern** **Low Concern**
Sloping and Landscaping (Medium- & Long Term): ⁎ Erosion of returned topsoil after rehabilitation. ⁎ Infestation of the reinstated area with invader plant species. ⁎ Potential impact associated with litter left at the mining area. ⁎ Uneven surfaces or steep slopes left upon closure of the site. ⁎ Return of the mining to agricultural use upon closure (Positive Impact).	**Operational phase** **&** **Decommissioning phase**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Definite**	**Low Concern** **Low Concern** **Low Concern** **Low Concern** **Medium-High (+)**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
LAYOUT ALTERNATIVE 2			
Stripping and Stockpiling of Topsoil: - Alteration of the agricultural sense of place. - Loss of agricultural land for duration of mining. - Visual intrusion as a result of mining. - Potential impact on vegetation and listed and protected plant species. - Potential impact on the CBA1 area. - Loss of topsoil and fertility during mining and stockpiling. - Infestation of the topsoil heaps and mining area with invader plant species. - Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. - Dust nuisance as a result of the mining activities. - Noise nuisance as a result of the mining activities. - Potential impact on archaeological artefacts. - Potential impact on the drainage lines/watercourses within the mining area. - Potential increased erosion risk and destabilisation of the dune plume.	**Duration of operational phase ±27 years**	**Possible** **Definite** **Possible** **Possible** **Definite** **Low Possibility** **Low Possibility** **Possible** **Low Possibility** **Low Possibility** **Low Possibility** **Possible** **Low Possibility**	**Medium Concern** **Low-Medium Concern** **Medium Concern** **Low-Medium Concern** **Medium-High Concern** **Low Concern** **Low Concern** **Medium Concern** **Low Concern** **Low Concern** **Low Concern** **Low-Medium Concern** **Low Concern**
Excavation of sand from the mining footprint and loading onto trucks: - Visual intrusion associated with the excavation of the mineral. - Creating steep slopes and uneven surfaces. - Soil contamination from hydrocarbon spills. - Disturbance to fauna within the footprint area. - Dust nuisance as a result of the mining activities. - Noise nuisance as a result of the mining activities. - Potential impact associated with littering at the mining area. - Potential impact on areas of palaeontological concern. - Facilitation of erosion.	**Duration of operational phase ±27 years**	**Definite** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**Medium Concern** **Low Concern** **Low Concern** **Low Concern** **Low Concern** **Low Concern** **Low Concern** **Low Concern** **Low Concern**
Transporting of Mineral: - Dust nuisance caused by vehicles transporting the mineral. - Degradation of the access road. - Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	**Duration of operational phase ±27 years**	**Low Possibility** **Low Possibility** **Low Possibility**	**Low-Medium Concern** **Low Concern** **Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
LAYOUT ALTERNATIVE 2			
Cumulative Impacts: - Reduced ability to meet conservation obligations and targets (LA2) - Reduced ability to meet conservation obligations and targets (LA2+) - Impact the broad-scale ecological process (LA2) - Impact the broad-scale ecological process (LA2+) - Cumulative impact of projects on palaeontological resources (LA2)	**Duration of operational phase ±27 years**	**Possible** **Definite** **Possible** **Definite** **Low Possibility**	**Medium-High Concern** **High Concern** **Medium-High Concern** **High Concern** **Low Concern**
Sloping and Landscaping (Medium- & Long Term): - Erosion of returned topsoil after rehabilitation. - Infestation of the reinstated area with invader plant species. - Potential impact associated with litter left at the mining area. - Uneven surfaces or steep slopes left upon closure of the site. - Return of the mining to agricultural use upon closure (Positive Impact).	**Operational phase (progressive rehabilitation) & Decommissioning phase**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Definite**	**Low Concern** **Low Concern** **Low Concern** **Low Concern** **Medium-High (+)**

APPENDIX M

CLOSURE PLAN

APPENDIX N

FINANCIAL AND TECHNICAL ABILITY

APPENDIX O

SOCIAL AND LABOUR PLAN

APPENDIX P

EMERGENCY RESPONSE PROCEDURES

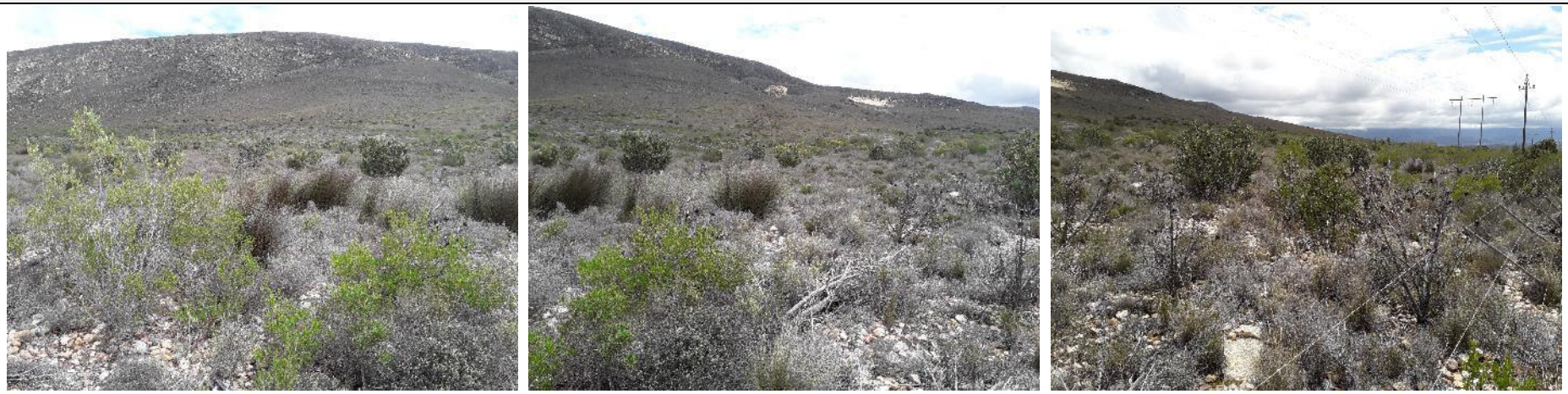
APPENDIX Q

STORM WATER MANAGEMENT PLAN

APPENDIX R

PHOTOGRAPHS OF THE EXTENSION AREA

ZANDBERG SAND MINE



PROPOSED EXTENSION AREA – VIEWED TOWARDS THE NORTH-EAST

PROPOSED EXTENSION AREA – VIEWED TOWARDS THE NORTH-WEST

ZANDBERG SAND MINE

VIEW OF THE EXISTING SAND MINING AREA

APPENDIX S

CV AND PROOF OF EXPERIENCE OF EAP